01workplace-chronology	
02unemployment-claim-review	
03unemployment-benefits-ruling	
04media-articles	
05disciplined-minds-excerpt	
06protests	
07job-security-promise	
08witnesses	
09submitted-3-january-2001	
10advisory-committee	
11gag-order	
12conversation-ban	
131998-performance-review-appeal	
141999-performance-review-appeal	
15probe-into-staff-discussions	
16work-log	
17work-agreement	
18praise-for-work	

PHYSICS TODAY MAGAZINE WORKPLACE CHRONOLOGY

1980

Jeff Schmidt graduates in physics from the University of California, Irvine, and registers with the American Institute of Physics job placement service.

Early 1981

Physics Today Editor Harold L. Davis invites Schmidt to apply for a job at the magazine.

Late February 1981

Physics Today brings Schmidt from California to New York for an interview. Schmidt talks to *Physics Today* Editor Harold L. Davis, senior editor Gloria B. Lubkin, managing editor Thomas von Foerster and to American Institute of Physics personnel manager Charlotte K. Maier and American Institute of Physics associate director, publishing, Robert H. Marks. Marks promises that Schmidt can go far by staying with AIP.

17 March 1981

Schmidt begins work at *Physics Today*, at the magazine's offices in the headquarters building of the American Institute of Physics, in New York City (Manhattan).

Within a year after beginning work

Management gives Schmidt a booklet that begins, "Welcome to the staff of the American Institute of Physics." The booklet gives examples of "an employee's own time": "meal periods, scheduled breaks, and time before or after a shift."

[American Institute of Physics Employee's Handbook, January 1982, page 16]

1981-2000

Bertram M. Schwarzschild, whose timeline of employment at *Physics Today* almost exactly parallels Schmidt's, openly spends company time on personal activities (rehearsing lines for plays, making personal telephone calls, debating topics at length with coworkers, writing fiction on his office computer, sending personal e-mail, surfing the Web, playing computer solitaire and so on), but is never fired. Schwarzschild's submissive attitude toward management and open seething with irrational prejudices against minorities, women, gays and so on contrasts sharply with Schmidt's attitude and behavior.

1981-2000, most years

Schmidt is given bonuses for perfect attendance.

1981-2000

Schmidt's work is praised by the authors of the articles he edits. Many of the authors are prominent physicists.

[See various letters]

1981-2000

Schmidt does work beyond that required by his job description. For example, he helps coworkers who write news stories and he researches possible feature article topics, proposes the

articles at meetings and solicits them.

10 December 1981

The National Labor Relations Board holds a union-representation election at the Woodbury, New York (Long Island), facility of the American Institute of Physics, the workplace of most AIP employees. Before the vote, AIP contracts with an anti-union consulting firm to resist unionization. AIP director H. William Koch and other top AIP managers meet with members of the voting units individually to discourage them from voting to unionize. Koch tells employees that "union benefits" are benefits for union officials and are very expensive. The large voting unit of nonprofessionals (typesetters) votes against unionization; the small voting unit of professionals (computer programmers) votes for unionization but later decides not to go it alone.

29 March 1982

American Institute of Physics director H. William Koch tells AIP staff that if they are subpoenaed to testify on behalf of the union at an upcoming NLRB hearing, AIP will not pay them for their time out of the office.

23 March 1983

Irwin Goodwin, born 19 August 1929, begins work as an editor at *Physics Today*.

24 August 1983

D. Allan Bromley, the Yale University nuclear physicist and member of the White House Science Council who later became President George Bush's science advisor, praises Schmidt's editorial work on Bromley's *Physics Today* feature article. Bromley writes to *Physics Today* Editor Harold L. Davis: "I must tell you that Jeff Schmidt did an absolutely outstanding job in editing the paper I had prepared on Neutrons in Science and Technology for presentation at the 40th Anniversary of Fermi's First Reactor at the University of Chicago. I made no changes whatsoever in what he had done. You really do not know how unusual that is because, almost inevitably, I end up having giant hassles with editors who work over my papers. Let me then put in a very strong plug for Jeff."

16 November 1984

Gloria B. Lubkin, born 16 May 1933 and a *Physics Today* staff member since 1963, is appointed Acting Editor of *Physics Today*. *Physics Today* Editor Harold L. Davis is fired.

1985

Gloria B. Lubkin is appointed Editor of *Physics Today*.

1989

Scientific journal publisher Gordon & Breach sues the American Institute of Physics for publishing in *Physics Today* an article that makes AIP journals look like a better value than G&B journals. AIP prevails on the basis of free speech. G&B sues AIP in other countries, too, ultimately without success, although the litigation goes on for 12 years. AIP's lawyer is Richard Meserve of Covington & Burling, Washington, D.C. Schmidt edited the article (Henry H. Barschall, "Cost Effectiveness of Physics Journals," *Physics Today*, July 1988, pages 56–59.)

27 December 1989

Paul Hersch begins work as managing editor of *Physics Today*.

Throughout the 1990s

Long-time *Physics Today* staff member Bertram Schwarzschild openly refers to Schmidt as "the union representative," because Schmidt regularly speaks up on behalf of coworkers.

27 March 1991

Schmidt is promoted from Associate Editor Level I to Associate Editor Level II based on the quantity and quality of his work.

27 July 1993

Schmidt is promoted from Associate Editor Level II to Senior Associate Editor based explicitly on the quantity and quality of his work.

[Document dated 17 February 1993 and memorandum dated 27 July 1993]

October 1993

Physics Today moves from Manhattan (New York City) to College Park, Maryland. The company moves Schmidt from Manhattan to Washington, D.C., on 1 November 1993.

20 December 1993

Stephen G. Benka starts work at *Physics Today* as an associate editor, a non-management position. Nine months later he is appointed Editor of *Physics Today*.

4 January 1994

Denis Coffi and Ray Ladbury begin work as editors at *Physics Today*.

22 or 24 February 1994

Charles Harris begins work as publisher of *Physics Today*, a newly created position higher than Editor.

1994

Physics Today publisher Charles Harris authorizes Schmidt to work at home, in Washington, D.C., one day per week.

1994

Physics Today publisher Charles Harris tells Schmidt ominously that a single dissident can affect an entire workplace, indicating that *Physics Today* Editor Gloria B. Lubkin may have told Harris things about Schmidt.

29 September 1994

Stephen G. Benka is appointed Editor of *Physics Today*, replacing Gloria B. Lubkin, who is demoted to "editorial director."

24 October 1994

Physics Today managing editor Kenneth J. McNaughton pursues a personal 200-page journal

editing project in part on office time and sends by Federal Express at company expense a heavy package associated with that project.

[See cover letter dated 22 October 1994 and sent 24 October 1994 from McNaughton to Ablex Publishing Corporation; Ken McNaughton, guest editor, *Creativity Research Journal*, Volume 7, numbers 3 and 4, 1994]

Beginning around 1995

Physics Today Editor Stephen G. Benka behaves abusively toward individual staff members, repeatedly blowing up at them, yelling at them. In one incident, Benka angrily follows *Physics Today* staff member Graham Collins out of the office, out of the building and into the parking lot.

Around 1995 to 2000

The American Institute of Physics recognizes that newly appointed *Physics Today* Editor Stephen G. Benka is deficient as a manager and requires him to attend management training classes over a long period of time.

1995–2000

Physics Today Editor Stephen G. Benka praises Schmidt's work repeatedly. [Various documents]

25 May 1995

Schmidt tells *Physics Today* Editor Stephen G. Benka that Benka has failed to provide him with an adequate amount of work (articles to edit) and that this is a chronic problem that limits the number of articles Schmidt can edit per year.

[25 May 1995 memorandum from Schmidt to Benka]

26 May 1995

Schmidt notes that Benka provided him with no work for an entire week (23 May 1995 to 30 May 1995) and that this is the third time in the past 11 weeks that Benka has let Schmidt run out of work.

[Note of 26 May 1995]

Around 8 March 1996

Physics Today publisher Charles Harris meets with Schmidt to discuss management's draft review of Schmidt's job performance. Harris decides to raise Schmidt's job performance rating from "Meets Job Requirements" to "Exceeds Job Requirements." Harris notes in a tone of regret that this change will make it harder for the company to get rid of Schmidt. Schmidt asks what Harris means. Harris explains that should the company decide to get rid of Schmidt, it would now take at least year longer to do so, because it can't credibly lower its view of an employee's performance abruptly. (Harris says nothing to suggest that he plans to shift from the carrot to the stick in dealing with Schmidt.)

14 March 1996

Schmidt's 1996 performance review says he edited 16 articles and gives him a rating of "Exceeds Job Requirements."

The review says, "His comments in meetings often provide a useful counterpoint to discussions," and "His comments and views on editorial ideas and policies, while sometimes contrarian, are generally insightful."

22 July 1996

Schmidt is short of work because *Physics Today* Editor Stephen G. Benka has failed to solicit sufficient articles for the magazine. Schmidt writes a note to Benka asking for work. [Note of 22 July 1996]

4 October 1996

On behalf of staff members who have been pushing for pay equity at *Physics Today*, Schmidt tells the *Physics Today* advisory committee, at their annual meeting, that the large salary differentials among the staff are not only unfair, but also divisive and bad for morale and productivity. Schmidt raised this issue at various staff meetings as well. Management is not pleased by the pressure, in part because it forces them to give the most underpaid employee, Jean A. Kumagai, a special 25% salary increase, beginning 1 June 1997.

22-23 October 1996

Schmidt works with coworkers Jean Kumagai, Toni Feder and Paul Elliott to push for the hiring of additional staff and for staff participation in the hiring process. They send notes asking that these issues be put on the agenda of a staff meeting scheduled for 24 October 1996. [22 October 1996 note from Schmidt, 22 October 1996 e-mail from Kumagai, 22 October 1996 e-mail from Feder, 23 October 1996 e-mail from Graham Collins]

15 November 1996

The *Physics Today* advisory committee, based on staff grievances brought to the committee's attention by Schmidt and his coworkers at the committee's 4 October 1996 meeting, issues a report strongly critical of working conditions at the magazine.

[Committee report e-mailed to staff by Benka 15 November 1996]

15 November 1996

Schmidt and some coworkers, after discussions with many more coworkers, give *Physics Today* managers and staff a ten-point list of changes that they want made at the *Physics Today* workplace. They present their requests in the form of a proposed agenda for a two-day retreat scheduled for 19–20 November 1996. Fearing reprisals for making requests that might not please management, those involved do not disclose their names; however, the fact that Schmidt played a leading role is known to all.

Job security is the employees' highest priority, and their demand for that tops their list. (See item 1 in document of 15 November 1996).

Among the other demands are the following:

Staff involvement in workplace dispute resolution (item 4).

Better distribution of job tasks (item 5).

Change hiring practices "to increase diversity of *Physics Today* staff" (item 8).

Provide conditions of employment appropriate for professionals (the other items). [Document of 15 November 1996]

17 November 1996

In response to a demand for greater job security by a group of concerned staff members, *Physics Today* Editor Stephen G. Benka promises the entire staff that job security will be based on job performance. This is a change from the magazine's previous policy of "at will" employment, in which employment could be terminated for any reason.

[Document of 15 November 1996 and 17 November 1996 statement by Benka]

Beginning around 1996[?]

Physics Today publisher Charles Harris makes it clear to Schmidt and to many other staff members that their concerted activities have infuriated him.

After late 1996

In response to Schmidt's continued leadership in concerted workplace activities, there is a turning point in management's attitude toward Schmidt, a distinct and permanent change in management's tactics in dealing with Schmidt, a shift from trying to incorporate Schmidt into the decision-making process to trying to exclude him, a shift from the carrot to the stick. *Physics Today* publisher Charles Harris is no more Mr. Nice Guy.

DATE?

To comply with the law, the American Institute of Physics decides to make its many independent contractors regular employees. Schmidt, acting on behalf of coworker Paul Elliott, such an employee, protests to *Physics Today* publisher Charles Harris that Harris is making Elliott apply for Elliott's own job. The magazine immediately reverses itself and offers Elliott the job.

3 January 1997

Schmidt tells Benka that Benka has failed to provide him with an adequate amount of work (articles to edit) and that this is a chronic problem that limits the number of articles Schmidt can edit per year.

[3 January 1997 note from Schmidt to Benka]

13 February 1997

Schmidt's 1997 performance review says, "He edited 15 feature articles in this period, one shy of his agreed upon goal of 16." Schmidt is given a rating of "Exceeds Job Requirements."

The review says, "His comments in meetings often provide a useful counterpoint to discussions," and "His comments and views on editorial ideas and policies are generally insightful."

Around 25 July 1997

Schmidt begins working at home, in Washington, D.C., three or four days per week.

18 August 1997

Schmidt writes to Benka about the chronic shortage of work (articles to edit). He asks Benka for more articles to edit. (Benka responds defensively, as providing the work is his job.) [Memos of 18 August 1997, 19 August 1997, 25 August 1997 and 2 September 1997]

19 August 1997

Benka surreptitiously changes Schmidt's job description to make it look like Schmidt is partly responsible for providing the work that Benka is supposed to provide but has been deficient in providing.

25 August 1997

Schmidt discovers Benka's surreptitious change in Schmidt's job description and agrees to the change because it shifts Schmidt's work from an area in which Benka has been deficient in providing work to an area in which work is available. Schmidt makes Benka write a note saying that Schmidt's job description has been changed. The new job description changes Schmidt's article editing quota from 16 per year to 14 per year.

[Note of 25 August 1997]

18 September 1997

A majority of the *Physics Today* staff, led by Schmidt and others, give *Physics Today* managers and staff a list of concerns centered around a demand for working conditions appropriate for professionals. They present their concerns as a request for agenda time at a one-day retreat scheduled for 25 September 1997. Schmidt's leading role in producing the agenda items is known to all.

[E-mail message of 18 September 1997.]

18-24 September 1997

Management reacts angrily to the staff's agenda request. The days leading up to the 25 September 1997 retreat see much debate between management and many staff members over the agenda, which management is formulating. *Physics Today* publisher Charles Harris becomes upset that the staff isn't embracing his agenda, and he begins treating Schmidt and Graham Collins as ringleaders on the staff side, apparently becoming permanently angry at these two outspoken staff members. (Harris's anger never subsides; he is fired around 2 March 1999.)

22 September 1997

Schmidt, speaking for six staff members, asks *Physics Today* publisher Charles Harris to include the support staff in the 25 September 1997 retreat. At a 16 September 1997 staff meeting, Harris had indicated that he did not want the support staff to attend.

[E-mail messages of 22–24 September 1997]

25 September 1997

Near the beginning of a staff retreat, Schmidt asks if staff members may ask questions. *Physics Today* publisher Charles Harris says no. Schmidt argues that staff members *should* be allowed to ask questions at a retreat. Harris angrily shouts "No, That's an order!", ending the discussion.

At the retreat itself, and in subsequent weeks, a number of Schmidt's coworkers publicly criticize Harris for the way in which he shut Schmidt up. A number of staff members — Graham Collins,

for example — consider resigning.

Some days after the retreat, Harris tells Schmidt that he thought Schmidt's request for the right to ask questions was a disguised attempt to raise issues of staff concern.

Ever since the 25 September 1997 retreat

Physics Today publisher Charles Harris gives Schmidt the impression that management is closely monitoring Schmidt. After the retreat, Harris himself attends almost every magazine department meeting that Schmidt attends — meetings that Harris had only rarely attended in the past. After some meetings, Harris comments privately to Schmidt's coworkers about Schmidt's performance.

Schmidt's work is subjected to increased scrutiny. Without precedent, the magazine's management examines and criticizes some of Schmidt's work before he even completes it. (That is Schmidt's work on the first of the five decade sections for the May 1998 50th anniversary issue of *Physics Today*.)

1 October 1997

Gag order put on Schmidt. *Physics Today* publisher Charles Harris and Editor Stephen G. Benka hand Schmidt a written "notice" that implies that Schmidt will be fired the next time he says anything that management considers to be "counterproductive."

The notice also orders Schmidt not to tell his coworkers that he is under this restriction. Schmidt immediately violates that provision, and Harris repeatedly criticizes him for doing so. [Document dated 26 September 1997.]

15 October 1997

In a written statement to the *Physics Today* staff, publisher Charles Harris says that "the staff should be free to engage in constructive criticism and discussion without fear of retribution" and promises that "while we can't guarantee life employment,… continued employment is based on satisfactory performance."

[Statement of 15 October 1997]

17 October 1997

Schmidt and a group of coworkers, in a written grievance presented to the *Physics Today* advisory committee at its annual meeting on 17 October 1997, ask for relief from "the increasingly repressive work environment at the magazine." The appeal describes how *Physics Today* staff members Jeff Schmidt and Graham Collins have been warned about speaking up about workplace problems. It says, "Both Jeff and Graham have been outspoken about problems that many of us see at the magazine. We feel that the [gag orders on them] contribute to a repressive atmosphere at the magazine and restrict all of us. We hope the advisory committee will do whatever it can to get these warnings retracted, and to remind the PT managers that repression is counterproductive. Such steps would go a long way toward diminishing the fear that staff members now associate with trying to openly address problems at the magazine." Fearing reprisals for making requests that would not please management, those involved do not disclose their names; however, the fact that Schmidt played a leading role is known to all.

[Memo of 17 October 1997]

In addition to the written presentation to the advisory committee, Schmidt and the group of coworkers also present their collective grievances to the committee orally in a coordinated way as they meet privately with the committee, one at a time.

In the weeks and months following 17 October 1997

Physics Today publisher Charles Harris harshly criticizes Schmidt for his leading role in the presentation of staff grievances to the *Physics Today* advisory committee on 17 October 1997, telling Schmidt and others incorrectly that Schmidt tried to get him fired. Harris makes it clear that he sees Schmidt's actions as an unforgivable offense that obligates Harris as a matter of manly honor to fire Schmidt or eventually drive him out and that gives Harris the moral right to do that by any means.

24 October 1997

Gag order put on Graham Collins. *Physics Today* management lets staff know that problems are to be discussed with managers on an individual basis only. This is communicated to the staff through a warning to Graham Collins and in other ways.

Collins sends an e-mail message to the non-management *Physics Today* staff with the subject line: "My coming silence."

[24 October 1997 e-mail from Collins]

Around 13 November 1997 [date of monthly staff meeting]

Coworkers force management to rescind the gag orders on Schmidt and Graham Collins. The gag orders had outraged many coworkers, most of whom were afraid to speak out on staff grievances themselves but valued Schmidt and Collins doing so for them. Many staff members openly criticized the gag orders, forcing *Physics Today* publisher Charles Harris, at the November 1997 monthly staff meeting, to agree to rescind them. Harris does so reluctantly and without any decrease in his anger toward Schmidt and Collins.

[E-mail message of 1 December 1997.]

2 December 1997

Management rescinds the gag orders on Schmidt and Graham Collins. [E-mail messages of 2 December 1997.]

22 January 1998

Schmidt appeals to *Physics Today* publisher Charles Harris for relief from the pressure to take on additional (clerical) work. Harris says he is not inclined to give Schmidt any consideration, because of Schmidt's and Graham Collins's previous-year organizing activity, which Harris says is a threat to Harris's own job.

[4 February 1998 letter from Schmidt to Collins]

28 January 1998

Physics Today Editor Stephen G. Benka breaks up two conversations between Schmidt and coworker Toni Feder after working hours.

Benka bans private conversations in the workplace, saying that all conversations between staff members must be open to monitoring by management.

When Schmidt asks Benka why, Benka refers to the organizing activity that took place the previous year and says he doesn't want that to happen again.

Management's disruptions of the two Schmidt/Feder conversations on 28 January 1998 and ban on future private conversations appear to be aimed specifically at Schmidt even though Benka says the rule applies to all employees.

[4 February 1998 letter from Schmidt to Collins]

Shortly after 28 January 1998

News of management's dislike of private conversations in the workplace spreads quickly throughout the staff (yes, by way of private conversations) and puts a chill on everyone's expression.

Paul Elliott complains to *Physics Today* publisher Charles Harris about the ban on private conversations between staff members, but Harris takes no action. Harris says he is "100 percent sure" that in the conversation between Schmidt and Feder that Benka broke up, Schmidt was organizing against management's push to shift clerical work from the secretarial staff to the editors.

6 March 1998

Susan Funk, *Physics Today* Editor Stephen G. Benka's assistant, quits in frustration. Without giving notice, she cleans out her desk, goes home and never returns.

16 March 1998

Schmidt and Jean Kumagai give outspoken coworker Graham Collins a letter criticizing *Physics Today*'s new love-it-or-leave-it policy, which made resignation his best option.

1998 [shortly after Graham Collins's resignation]

Carol Lucas, *Physics Today* publisher Charles Harris's assistant, resigns.

20 March 1998

During a meeting between Schmidt and American Institute of Physics Executive Director and Chief Executive Officer Marc H. Brodsky about employment practices at *Physics Today*, Brodsky tells Schmidt that some of Schmidt's workplace activities, presumably reported to Brodsky by *Physics Today* publisher Charles Harris, are "counterproductive."

24 March 1998

Schmidt meets with *Physics Today* Editor Stephen G. Benka to discuss his 1998 performance review. Benka condemns Schmidt's organizing activities at the magazine, focusing in particular on Schmidt's leading role in the concerted activity around the 19–20 November 1996 *Physics Today* retreat, even though that activity occurred before the period covered by the review.

Benka characterizes the staff actions in which Schmidt has played a leading role as nothing more

than "disruptive." Benka says: "You have spent a lot of time in, shall we say, disruptive efforts. You were formally reprimanded during this period [an apparent reference to the gag order]. That's been buried [an apparent reference to the rescindment of the gag order], but it certainly had its effect on the office and everyone."

This meeting is the first performance review discussion in which Benka criticizes Schmidt for his organizing activities around the 1996 retreat. Benka strongly condemns this 1996 concerted activity, in which staff members anonymously proposed an agenda that addressed their concerns about job security and working conditions. Benka calls the group of staff members who did this "your cabal." He calls them "people who wouldn't step forward," but he talks as if he has no doubt that Schmidt was not only one of them, but also a leading member. Referring to the group's efforts to get its concerns discussed, Benka warns Schmidt, "Anything — any behavior that generates such feelings, such divisions, such divisiveness, such disruption among the staff — is not going to be tolerated anymore."

Schmidt tells Benka that staff members fear reprisal for speaking out about workplace problems. Benka responds: "Now, why would they fear that? If they're acting in good faith, then why would they fear it? But if they're not acting in good faith, they may have reason. If they're acting in order *to* engender divisiveness and trouble, if they're acting in bad faith, they may have reason to fear." Benka says: "If they're that afraid, maybe they should go where they're less afraid — if it's that unbearable."

The performance review lowers Schmidt's performance rating from "Exceeds Job Requirements" to "Meets Job Requirements" even though Schmidt did more work and more innovative work. The review makes what it admits are "new demands," which amount to a sharp increase in Schmidt's workload — from 14 feature articles per year to 18 — a 28 percent jump.

Schmidt: "I don't know of any others who have been asked to increase the amount of work they do."

Benka: "Oh yes they have" [repeats this a few more times].... I don't know why it's taken this long to ask you to increase as well."

Schmidt asks Benka to make corrections in the review. After consulting with *Physics Today* publisher Charles Harris, Benka refuses to make any changes in the review.

In its employee handbook, the American Institute of Physics promises employees that their annual performance review will feature a discussion of "mutual goals." Without explanation, Benka follows neither the letter nor the spirit of this policy, and doesn't even pretend to be interested in what direction Schmidt might want to go in his work at AIP. The discussion is unlike anything Schmidt had experienced in previous years. Benka simply announces a big change in Schmidt's job description — an increase in Schmidt's workload by as much as three months' worth of work per year — and discusses it as if he were a dictator giving orders. Rather than follow the participatory process promised in the employee handbook, management changes Schmidt's job description by unilateral dictate, without discussion or agreement.

Schmidt's fellow outspoken coworker Graham Collins leaves *Physics Today*. In explanation of the dissatisfaction that drove him to resign, Collins tells the American Institute of Physics that "Marc Brodsky [AIP executive director and chief executive officer] wishes to believe that the only problems are employees who complain too much."

[Collins's exit interview form, 24 April 1998]

27 April 1998

Schmidt appeals his 1998 performance review to American Institute of Physics director of human resources Theresa C. Braun and director of physics programs James H. Stith. The appeal is 19 pages long with an additional 38 pages of supporting documents. The appeal details some of the ways in which the review is inaccurate and explains how it is a reprisal for Schmidt's organizing activity and is part of a series of attempts to stop him from engaging in further concerted activity at Physics Today.

Schmidt gives copies of his 57-page appeal to 12 coworkers. [57-page document dated 27 April 1998]

30 April 1998

The American Institute of Physics formalizes its computer use policy, saying that it "makes its computer equipment available to employees for personal use" on a causal basis for non-commercial purposes such as "educational, recreational, hobby, and community service." [18 June 1998 memorandum from Marc H. Brodsky to all AIP employees]

25 June 1998

Schmidt meets for two hours with American Institute of Physics director of physics programs James H. Stith about Schmidt's 1998 performance review appeal. Stith refuses to make any corrections at all in Schmidt's 1998 performance review.

Stith does not defend the review's criticisms of Schmidt, nor does he dispute Schmidt's detailed claim that the review makes many false statements about Schmidt. Stith says he decided to leave these statements in the review (and thus in Schmidt's permanent personnel record) because he had talked to *Physics Today* managers Charles Harris and Stephen G. Benka, who told him other things about Schmidt — things not mentioned in the review — and these things justified the lowering of Schmidt's job performance rating. Despite vigorous questioning by Schmidt, Stith refuses to say what these things are. However, Stith makes it clear that the problem is Schmidt's organizing activity, just as Schmidt had claimed in his appeal. Stith tells Schmidt that when you do things that your supervisors would be happier that you not do, then you have to be willing to pay the penalty, even if what you do is right. Schmidt responds that he expects Stith to protect people from being punished for doing the right thing. But Stith makes it clear that he will not play that appellate role at AIP. Stith says that in his younger days, he challenged the status quo. He says that even after the status quo yielded to change, he still had to pay a price for his actions, implying that paying such a price was right.

Schmidt appeals the ban on private conversations in the workplace to Stith. Stith tells Schmidt he knows about the ban, which was described in Schmidt's 27 April 1998 performance review appeal. Schmidt asks Stith to retract it. Stith promises to look into it, but never lifts the ban.

16 July 1998

Schmidt sends an e-mail message to a dozen coworkers reporting on American Institute of Physics director of physics programs James H. Stith's refusal to make any corrections in Schmidt's 1998 performance review.

20 August 1998

Schmidt meets with American Institute of Physics director of physics programs James H. Stith about Schmidt's 1998 performance review. Stith admits repeatedly that the performance review was "subjective," but he refuses to put that in writing.

23 September 1998

Schmidt notes in an e-mail message to a coworker that *Physics Today* Editor Stephen G. Benka has failed to provide him with an adequate amount of work (articles to edit) and that this is a chronic problem. Schmidt writes, "They pressure me to edit more articles per year, but make it impossible to do so."

6 October 1998

Physics Today publisher Charles Harris, in a conversation with Schmidt, criticizes the management abilities of *Physics Today* Editor Stephen G. Benka and tells Schmidt that Harris is going to take away Benka's right to issue performance reviews and memos concerning personnel matters on his own. Harris will have to approve all such material before it is issued.

Mid-December 1998 to mid-June 1999

Schmidt takes a six-month unpaid leave of absence.

Around 2 March 1999

Physics Today publisher Charles Harris is fired.

Mid-June 1999

Physics Today Editor Stephen G. Benka criticizes Schmidt harshly (and for the first time, even though it has been 14 months since it happened), for showing his 1998 performance review appeal to coworkers. That document reviews workplace issues in detail. Benka says, "You are lucky you still have your job after doing that." (This is an exact or nearly exact quote.)

22 June 1999

Schmidt meets with *Physics Today* interim publisher Gary Squires to propose a way to deal with the big increase in Schmidt's workload. Schmidt says, "My goal has been 16 articles per year, and I haven't made it sometimes, and sometimes I have. But then we had some heavy office politics here, a year or so ago. I kind of fell out of favor with management, and they got on my case and said that I should be producing 18 articles per year. One of the reasons I went on this [six-month] leave was to think about some solution to the problem, because 18 is more than I can do. I could barely do 16. And I came up with a solution.... I would accept the goal of 18 articles, but I would do two-thirds of that for two-thirds of the salary. That's 12 articles per year — which is two-thirds of 18 — for two-thirds of the salary.... Normally I would have gone directly to Steve to talk about this, but he's been so hard-lined — so mean spirited — about this, that I got the impression that maybe he wants to set a goal higher than I can meet, to get rid of me

altogether.... [I'd] accept the number 18, even though I think it's wrong. I would just do a fraction of that for a fraction of the pay. I wouldn't be disputing the 18 in a sense, although I ... see it as punitive, because for years 16 has been the goal."

29 June 1999

In response to the sharp increase in his workload imposed by management, Schmidt asks to work on a 2/3-time basis, writing in his request that "after all these years, at my age, I am not prepared to take on additional work."

9 August 1999

Benka tells Schmidt that his request to work 2/3 time has been approved and will take effect 20 September 1999.

17 August 1999

Schmidt is given an inaccurate and punitive 1999 performance review covering February 1998 to August 1999.

The review says, "During this review period, Jeff repeatedly engaged in disruptive and counterproductive behavior, damaging a collegial office climate and thereby undermining the editorial effort of *Physics Today*. Such behavior is unacceptable." An example of such behavior, according to the review, is Schmidt's showing coworkers his 1998 performance review appeal — a document that details workplace issues at *Physics Today* and discusses concerted activity to address those issues. The 1999 review criticizes and punishes Schmidt for this communication with coworkers. It says that such communication serves to "undermine...the staff's respect for management."

17–19 August 1999

Schmidt holds discussions with a number of coworkers to organize support for the right of employees to discuss with each other performance reviews and punitive action by management. Schmidt's effort is prompted by management's 17 August 1999 punishment of Schmidt for discussing with coworkers his previous year's performance review and other workplace issues that Schmidt's supervisor says "had nothing to do with the review." Schmidt also discusses with his coworkers other workplace issues, including punitive action by management (as distinguished from the right to discuss punitive action by management, mentioned above).

19 August 1999

Schmidt meets with Physics Today Editor Stephen G. Benka about Schmidt's 1999 performance review. In strong language, Benka expresses his anger at Schmidt's communications with coworkers about workplace issues. Benka focuses on Schmidt's April 1998 communications with coworkers (one and one-third years back), which Benka hotly condemns. (In April 1998, prompted by a punitive performance review that was a reprisal for Schmidt's workplace activism, Schmidt had written and circulated to his coworkers a memo about the reprisal and about workplace issues.)

Benka tells Schmidt, "We both realize full well that any group of people can be influenced in any number of ways. Management has a certain type of influence. Individuals within the group have

a certain type of influence.... And I'm saying that you need to pay very close attention to your influence on this group.... What was *extremely* destructive about what you did last year, was circulating your response. What was extremely destructive was how much of it had *nothing* to do with the review.... I *don't* want to see *anything* of this sort again. Is that clear? ... I want to see an *end* to that, Jeff."

Benka admonishes Schmidt for talking to coworkers about the punitive 1999 review, too, which Benka wanted to keep secret. Benka verbally demands that Schmidt tell him which coworkers Schmidt has spoken with about issues raised in Schmidt's 1999 performance review. Schmidt refuses. Benka insists. (Benka: "Who did you tell?" Schmidt: "I don't want to get anybody in trouble." Benka: "It's best to get it out now.") Schmidt says he will ask the coworkers for permission. Later the same day, Benka reiterates his demand in an e-mail message to Schmidt, saying, "I still would like you to tell me which member or members of the staff you have discussed this year's review with."

Benka says, "Let me ask now why you're already going to the staff ... before we have even discussed it [the punitive 1999 performance review]. I gave it to you two days ago with the understanding that you look it over, think it over, and we would talk about it today. That's the process. You've already jumped beyond that, by discussing it with someone else before even discussing it with me."

Benka tells Schmidt, "What you're describing is entirely out of the procedures of AIP for performance reviews, where these reviews are one-on-one between the employee and the manager.... That's not the procedure that you're following. ... That's what I mean by confidentiality, but you don't seem to abide by that at all. You are interested in other people's reviews and in sharing yours with other people."

Beginning soon after 19 August 1999

Schmidt and coworkers confer to decide how to respond to Benka's demands, how to stand up for the right to communicate privately about workplace issues and how to stand up for the right to discuss punitive and other reviews.

26 August 1999

Schmidt reports to Benka that Schmidt and coworkers decided not to reveal any names to Benka or give Benka anything that Benka could use to try to identify which staff members are involved in private discussions. Schmidt and coworkers decided that Schmidt should give Benka only a verbal report on their views, based on notes that they agree on. Schmidt does that, but Benka demands repeatedly that Schmidt give him the notes, too. Schmidt refuses but agrees to consult again with coworkers. (Schmidt and coworkers decide to give Benka a brief, agreed-upon written report, which Schmidt does on 30 August 1999.)

Benka reiterates his opposition to private conversations between staff members about workplace issues, saying "everything to do with the job, with *PT*, is in my domain. For job-related things, there should be no privacy from me." Schmidt, speaking on behalf of many staff members (those he conferred with), defends private conversations and asks Benka to stop his investigation into those conversations.

26 August 1999

Schmidt and Benka agree to change Schmidt's job description back to 80 percent article editing.

1 September 1999

Schmidt's annual salary is raised to \$67,850.

17 September 1999

Schmidt and the American Institute of Physics enter into an agreement specifying the amount of work Schmidt will do and what he will be paid in return for doing that work. The written agreement is approved by Schmidt and signed by a director of the American Institute of Physics (James H. Stith).

[Document dated 14 September 1999]

20 September 1999

Schmidt begins 2/3-time work with full benefits.

9–10 November 1999

Schmidt requests permission to either use his accumulated vacation time or carry it over to the year 2000; his request concerns only the amount of vacation time beyond the amount that is automatically carried over to the next year. (Verbal request 9 November 1999; written request 10 November 1999.) Management doesn't respond for a full month, giving vacation-use permission on 10 December 1999, which does not leave enough time in the year for Schmidt to plan and use all the vacation time. Management's response is partial, saying that the issue of carryover will be addressed later. After many written communications with Schmidt and two meetings with him over a period of a few months, management makes Schmidt forfeit much of his vacation time. Also, without Schmidt's knowledge and without notification, the amount of vacation time that he is allowed to carry over automatically (to the year 2000) is lowered to 175 hours from 262.5 hours the previous year; Schmidt discovers this after the fact, when he sees his earnings statement of 15 January 2000.

Schmidt's coworker Paul Elliott is in an identical situation and makes an identical request exactly one week after Schmidt's 10 November 1999 request. However, management allows Elliott to carry over to the year 2000 all of his unused vacation time — but makes him promise not to tell his coworkers.

After Schmidt is fired, he is paid for his remaining vacation time, which does not include his forfeited vacation time. He is paid for only two of the total of four "personal days" and "bonus days" due him.

24 November 1999

Jean Kumagai leaves *Physics Today*, in part because of *Physics Today*'s repression of concerted staff activities. Kumagai was widely considered to be one of the best editors at the magazine. She was one of Schmidt's partners in concerted activity.

5 April 2000

Schmidt meets with *Physics Today* publisher Randolph A. Nanna and Editor Stephen G. Benka

about vacation carryover. When Schmidt objects to AIP's decision to make him pay for AIP's admitted mistake, Nanna says, "And that's my opinion [too]. Would I like it done to me? Probably not."

24 April 2000

Physics Today Editor Stephen G. Benka and publisher Randolph A. Nanna announce that *Physics Today* Washington correspondent Irwin Goodwin, after 17 years at the magazine, "has decided to move on." Goodwin leaves on 30 June 2000, not necessarily voluntarily.

Around or just after mid-May 2000

Schmidt and coworker Toni Feder are talking alone in the *Physics Today* art office when *Physics Today* Editor Stephen G. Benka enters the room and notes to them that he noticed that they stopped talking when he showed up.

22 May 2000

Schmidt's immediate supervisor, *Physics Today* Editor Stephen G. Benka, learns of Schmidt's book, *Disciplined Minds*, when Benka comes upon a *Physics Today* staff member reading an article about it in the "Hot Type" column of the 26 May 2000 issue of the *Chronicle of Higher Education*.

30 May 2000

Historian Spencer Weart, director of the American Institute of Physics Center for History of Physics, reviews *Disciplined Minds* and sends his comments to Schmidt. Weart gives the book a very positive review and approves it for inclusion in the physics community section of the Niels Bohr Library, a specialized collection with limited space.

Schmidt distributes Weart's review to all *Physics Today* staff and management.

Around 31 May 2000

Schmidt fulfills his entire annual review-period work quota in the first 10 months of the period. That is, he is two months ahead in his work.

31 May 2000, morning

Physics Today fires Schmidt.

31 May 2000, afternoon

Physics Today Editor Stephen G. Benka goes from office to office at *Physics Today*, telling each staff member that American Institute of Physics executive director and chief executive officer Marc H. Brodsky authorized him to say why Schmidt was fired. Benka tells people that Schmidt was fired for doing something other than what he was being paid to do.

9 June 2000

The Chronicle of Higher Education reports Physics Today's firing of Schmidt.

9 June 2000

Schmidt's long-time *Physics Today* coworker Bert Schwarzschild, in a telephone call to Schmidt, details Schwarzschild's use of office time and details his annual workload. The amount of break time Schwarzschild takes is very much greater than the two 15-minute breaks specified in the employee handbook, and his annual workload is significantly less than Schmidt's, because management counts his short "picture caption" stories as "big-ticket items."

12 June 2000

The National Writers Union protests *Physics Today*'s firing of Schmidt.

15 June 2000

Journalist Marlowe Hood, a former *Physics Today* staff member who was involved in concerted workplace activity with Schmidt, protests the firing of Schmidt.

Before 16 June 2000

Physics Today charges Schmidt with misconduct, telling the State of Maryland Department of Labor, Office of Unemployment Insurance, that "The employee admittedly used company time to work on a personal project over an extended period of time."

16 or 19 June 2000

Physics Today tells Maryland Department of Labor, Office of Unemployment Insurance, claim examiner Tasha Owens, as evidence that Schmidt was writing the book on company time, that Schmidt had asked for reduced hours.

20 June 2000

Regarding Schmidt's request to work reduced hours, state examiner Owens tells Schmidt that the company "did not specify why you needed that time." According to the company, said Owens, "you didn't say what it was for; you just asked for reduced hours. And that they granted you the request." Owens tells Schmidt that the company "could not say what hours you spent doing the book. They don't know."

21 June 2000

Sixteen former *Physics Today* staff members, including many who were involved in concerted workplace activity with Schmidt, protest the firing of Schmidt.

24 June 2000

Princeton University physicist M. V. Ramana protests *Physics Today*'s firing of Schmidt.

26 June 2000

Physicist Kajoli Krishnan protests *Physics Today*'s firing of Schmidt.

26 June 2000

George Washington University management professor Denis Cioffi, a former *Physics Today* staff member who was involved in concerted workplace activity with Schmidt, protests firing of Schmidt.

26 June 2000

George Washington University expert systems professor Thomas Nagy protests firing of Schmidt.

26 June 2000

State of Maryland Department of Labor, Unemployment Office, issues determination, finding no evidence that Schmidt engaged in even simple misconduct on the job by writing *Disciplined Minds*. The state awards Schmidt full benefits, retroactive to 4 June 2000. *Physics Today* does not appeal the state's finding.

28 June 2000

Physicist Vikram Vyas protests *Physics Today*'s firing of Schmidt.

30 June 2000

Physicist Surendra Gadekar protests *Physics Today*'s firing of Schmidt.

5 July 2000

Chris Garlock, editor of the online newsletter of the Washington, D.C., local of the National Writers Union, notes that physicist Albert Einstein wrote the theory of relativity in part during his spare time at the Swiss patent office, where he was employed.

29 August 2000

Physics Today Editor Stephen G. Benka, having learned that Schmidt is monitoring the magazine's hiring practices, tells the *Physics Today* staff not to give Schmidt any information about the magazine's hiring practices. Benka also tells the staff not to discuss their performance reviews with anyone — a new rule.

STATE OF MARYLAND DEPARTMENT OF LABOR, LICENSING AND REGULATION OFFICE OF UNEMPLOYMENT INSURANCE 1100 N. EUTAW STREET, BALTIMORE, MD. 21201

Given to Tom McCarthy 27 Dec. 2000

SSN:

DATE: 06/12/2000

JEFF SCHMIDT 3003 VAN NESS ST NW APT W406

WASHINGTON

DC 20008-4830

NOTICE OF AVAILABLE BENEFIT WEEKS

YOUR NEXT WEEK ENDING DATE(S) TO FILE ARE: 06/17/2000 06/24/2000

YOU MAY FILE FOR THESE WEEK(S) AFTER 06/24/2000 BY CALLING THE CLAIMANT TELEPHONE INFORMATION SERVICE.

YOU MUST CONTINUE TO FILE YOUR TELECERTS FOR EACH WEEK THAT YOU ARE UNEMPLOYED AND REQUESTING PAYMENT OF BENEFITS.

WORK SEARCH CONTACTS ARE SUBJECT TO VERIFICATION. FALSE INFORMATION MAY RESULT IN DENIAL OF BENEFITS, FINES, AND/OR IMPRISONMENT.

NO BENEFITS WILL BE PAID PENDING REVIEW OF YOUR CLAIM BECAUSE OF INFORMATION THAT YOU MAY NO LONGER BE ELIGIBLE. YOU WILL GET AN APPOINTMENT NOTICE.
WORK SEARCH CONTACTS ARE SUBJECT TO VERIFICATION. FALSE INFORMATION MAY RESULT IN DENIAL OF BENEFITS, FINES AND/OR IMPRISONMENT.

ALL INQUIRIES CONCERNING YOUR CLAIM SHOULD BE DIRECTED TO THE CLAIMANT TELEPHONE INFORMATION SERVICE BY CALLING THE APPROPRIATE NUMBER LISTED BELOW:

Call toll free from anywhere in Maryland on a touch tone or rotary phone.
 Automated voice response information is available 24 hours a day, seven days a week.
 Service representatives are available to help with special problems or questions during business hours, Monday through Friday from 8:00 a.m. to 4:15 p.m.

(410) 949-0022

From Baltimore Area and Out-Of-State

(410) 767-2727

TDD From Baltimore Area and Out-Of-State

1-800-827-4839 Toll Free in Maryland only

1-800-827-4400 TDD Toll Free in Maryland only

Report on finding by Maryland Department of Labor

STATE REJECTS PHYSICS TODAY'S CHARGE OF EMPLOYEE MISCONDUCT

The State of Maryland Department of Labor conducted a surprisingly detailed investigation into the circumstances under which *Physics Today* fired me. On 26 June 2000 the department issued its "determination," rejecting the magazine's claim that I engaged in misconduct on the job by writing *Disciplined Minds*.

The investigation was prompted by my request for unemployment benefits, because eligibility for such benefits is limited to people who lose their jobs "through no fault of their own." Thus, if you quit your job or are fired for misconduct, you may not be entitled to benefits.

An unemployment office examiner explained to me that "Some employers send us information and indicate that they do not wish to dispute the claim." Such a statement paves the way for the employee to get benefits. *Physics Today* didn't do that. Instead, the magazine sought a ruling in its favor, which would not only punish me further and save the magazine money, but also give the magazine political support in the form of third-party validation of its action against me. Thus, *Physics Today* charged me with misconduct, telling the state that "The employee admittedly used company time to work on a personal project over an extended period of time." This made an investigation necessary so that the state could determine independently whether or not I engaged in misconduct.

The centerpiece of the investigation was a hearing that took the better part of an hour, during which I offered a very different theory of why the magazine fired me. I said that *Physics Today* fired me for political reasons — specifically, management didn't like the radical content of the book and was looking for an excuse to get rid of me because of my workplace activism.

Department of Labor examiner Tasha Owens conducted the hearing by telephone. I waived my right to representation, figuring that I could present the facts as well as anyone. Owens interviewed me first, for 28 minutes. To test the company's claim, she asked me questions about how much time at the office I spent writing the book. (Answer: Break time.) To test my claim, she asked me questions about whether or not the company ever asked me how much time at the office I spent writing the book. (Answer: No, they didn't seem to care about that.) At the end of the interview, she scheduled me for a follow-up interview to give me the opportunity to rebut points that *Physics Today* would make in its interview.

However, Owens didn't call at the appointed time, and so I called her and asked why. She said, "There was nothing to rebut." Interestingly, *Physics Today* and I agreed about what I did, and disagreed only about whether or not my actions constituted misconduct. AIP, she said, "gave me the same information that you gave me."

Having gathered the facts, Owens had to make a decision. According to Susan R. Bass, an administrator in the office of the executive director of Maryland's unemployment insurance program, Owens had three levels of employee misconduct to choose from:

- o Simple misconduct Here the fired employee gets "delayed benefits," which begin after a five to ten week waiting period.
- o Gross misconduct No benefits.
- o Aggravated misconduct No benefits, and reduced eligibility for benefits following subsequent employment.

Owens ruled that my work on the book didn't even rise to the level of simple misconduct, and so she awarded me full benefits, retroactive to 4 June 2000. I will receive up to \$6,500, which the American Institute of Physics, the magazine's publisher, will pay for through increased unemployment insurance premiums.

Physics Today was given the opportunity to appeal the state's finding, but did not do so. If Physics Today sincerely believed its own story that it fired me for real misconduct on the job, and not just for political misconduct, it could have — and I think would have — appealed. The magazine would have appealed not only to save thousands of dollars, but also to dispel the implication that its motives for firing me weren't squeaky clean.

The hearing was a high-anxiety event because a lot was at stake, both monetarily and politically. Strangely, however, it was also fun, because it was so different from the way I was used to seeing disagreements resolved in the *Physics Today* workplace, where power so often trumps reason (see appendix below for an example). It was a pleasure to speak the truth outside of that repressive hierarchy; the favorable decision was just icing on the cake. The ruling means that *Physics Today* fired me for a reason other than "misconduct in connection with the work." Who will see that reason as anything other than political misconduct? *Physics Today* now has to consider the possibility that both the hearing and the third-party perception of its behavior are previews of future events.

Appendix — Example: Affirmative action

There are countless examples of power trumping reason in the *Physics Today* workplace, and I will summarize just one here.

Beginning a few years ago, I worked with Jean Kumagai and other *Physics Today* staff members to get the magazine to live up to its claim that it is an affirmative action employer. After many months of being largely ignored, we decided to raise the issue with the *Physics Today* advisory committee. I spoke to the committee on behalf of the concerned staff, and the committee reported our concerns to American Institute of Physics Executive Director and Chief Executive Officer Marc Brodsky, my boss's boss's boss's boss. Brodsky then contacted me and told me that I had made "a very, very serious charge." He demanded that I bring him the evidence. I did, in a written statement (available) and in an hour-long meeting with him. He said he would investigate the matter.

Five months later, Brodsky summoned me to his office to close the case. His conclusion: *Physics Today*'s affirmative action program was doing very well. He explained that he judges the program by its results. But what were the results? At that time, 20 March 1998, *Physics Today* had an all-white staff of editors and writers, with one exception. Since then, that one person has found other employment, in part because of her frustration over the magazine's affirmative action hypocrisy.

As of this writing, two years after Brodsky proclaimed affirmative action alive and well at *Physics Today*, the magazine has an all-white staff of editors. I'm not talking about a staff of four or five editors, who might all be white by coincidence. I'm talking about an all-white staff of 17 editors. (At least the magazine has hired minority group members as secretaries.) *Physics Today*'s editors do not look like the physics community, the journalism community, the Washington, D.C., community where the magazine is based, or the nation as a whole.

27 July 2000

STATE OF MARYLAND DEPARTMENT OF LABOR, LICENSING AND REGULATION OFFICE OF UNEMPLOYMENT INSURANCE

NOTICE OF BENEFIT DETERMINATION

SSN:

DATE MAILED: 06/26/2000

BENEFIT YEAR BEGINS: 06/04/2000

COLLEGE PARK CLAIM CENTER P.O. BOX 1901

COLLEGE PARK

MD 20740

MAIL REQUEST FOR APPEAL TO LOCAL OFFICE ADDRESS ABOVE

JEFF SCHMIDT 3003 VAN NESS ST NW APT W406

WASHINGTON

DC 20008 4830

ISSUE SIMPLE MISCONDUCT
SECTION OF LAW 8-1003
DATE OF DETERMINATION 06/26/2000
SPECIALIST ID EWCP1A

AMERICAN INSTITUTE OF PHYSICS
INCORPORATED
1 PHYSICS ELLIPSE
COLLEGE PARK MD 20740 3842

THE LAST DAY TO FILE AN APPEAL IS: 07/11/2000 (IF THIS DECISION IS CHANGED ON APPEAL, THE CLAIMANT WILL BE REQUIRED TO REPAY ANY RESULTING OVERPAYMENT.)

DETERMINATION:

THE CLAIMANT WAS DISCHARGE FROM AMERICAN INSTITUTE OF PHYSICS ON 6/2/00 BECAUSE IT WAS ALLEGED THAT THE CLAIMANT WROTE A BOOK ON COMPANY TIME.

INSUFFICIENT INFORMATION HAS BEEN PRESENTED TO SHOW THAT THE CLAIMANT'S ACTIONS CONSTITUTED MISCONDUCT IN CONNECTION WITH THE WORK. AS A RESULT, IT IS DETERMINED THAT THE CIRCUMSTANCES SURROUNDING THE SEPARATION DO NOT WARRANT A DISQUALIFICATION UNDER SECTION 8-1002 OR 8-1003 OF THE MARYLAND UNEMPLOYMENT INSURANCE LAW.

BENEFITS ARE ALLOWED, IF OTHERWISE ELIGIBLE.

APPEAL RIGHTS: |

CLAIMANT AND EMPLOYER: Section 8-509 of the Maryland Unemployment Insurance Law provides the right to appeal this determination. The appeal must be in writing and may be submitted in person or mailed to the Local Office within (15) days of the determination. If mailed, the appeal must be postmarked within (15) days of the date of this determination. A claimant who appeals a determination and remains unemployed must continue to file timely claims for each week. NO LATE CLAIMS WILL BE ACCEPTED. If an appeal decision results in reversal or modification of this determination, the claimant <u>may</u> be paid benefits previously denied or <u>may</u> be overpaid benefits previously paid.

THE CHRONICLE

of Higher Education®

DISCIPLINE THIS: Jeff Schmidt says his employers at Physics Today disliked his new book, Disciplined Minds: A Critical Look at Salaried Professionals and the Soul-Battering System That Shapes Their Lives (Rowman & Littlefield), so much that they decided to discipline him. In fact, they fired him.

Mr. Schmidt believes the trouble began after his boss, **Stephen G. Benka**, caught a co-worker reading an item about the book in Hot Type ("Steal This Book," May 26). "She was laughing out loud when my boss came along and asked, 'What's so funny?' " says Mr. Schmidt. Apparently, Mr. Benka was not amused by Mr. Schmidt's statement, quoted from the book, that he'd written *Disciplined Minds* partly on time stolen from work.

"He read it right there, but he didn't laugh," says Mr. Schmidt.

The following Wednesday, May 31, Mr. Benka asked him to join the publisher, **Randolph A. Nanna**, for a trip to the human-resources department. There a human-resources professional told him that he was being "terminated with cause" after 19 years at the magazine, during which Mr. Schmidt says he'd consistently received above-average or satisfactory evaluations. Then he was escorted out of the building without being allowed to return to his office.

Neither Mr. Nanna nor Mr. Benka would comment. **Theresa C. Braun,** director of human resources for the nonprofit American Institute of Physics, which publishes the magazine, said only that Mr. Schmidt "was not terminated because of the [Chronicle] article, nor because of the general content of the book."

Mr. Schmidt, who earned a Ph.D. in physics from the University of California at Irvine, says they told him that the very existence of the book was evidence that he wasn't "fully engaged" at *Physics Today*.

Hot Type

In fact, Mr. Schmidt's book argues that it is impossible to be "fully engaged" in a hierarchical institution, an argument that would hardly strike most people as new or shocking. The strength of the book, according to its supporters, lies in its humor and its detailed examination of the particularities of professional life.

"A witty, incisive, original analysis of the politics of professionalism," wrote **Michael Bérubé**, an English professor at the University of Illinois at Urbana-Champaign, in a jacket blurb. "Finally, a book that tells it like it is," wrote **Stanley Aronowitz**, a sociologist at the City University of New York.

Or now, for Mr. Schmidt, how it was.

—JEFF SHARLET

Science & Government Report

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Research Hospitals

A STAPLE OF ANIMAL RESEARCH PROTECTIONS IS COMING SOON TO HUMAN CLINICAL TRIALS

As the academic medical establishment looks to shore up its overburdened and leaky programs for protecting the human subjects of research, they're turning to a model that's long been employed in research using animals: accreditation.

A bipartisan House bill introduced June 8 with the blessing of the academic medical establishment would mandate the establishment of a government-sanctioned accreditation program for institutional human subjects protections within two years. A tiny Boston-based nonprofit called Public Responsibility in Medicine and Research (PRIM&R) has been working on such an accreditation program for more than a year, and is likely to be the entity that's given the job.

With encouragement—but no funding so far—from the National Institutes of Health and the Food and Drug Administration. PRIM&R is now nearing completion of a set of professional standards for research involving human subjects, says Executive Director Joan Rachlin. The 28-year-old organization has long provided educational programs for institutional review boards (IRBs)—the panels of scientists and others that review clinical research protocols to ensure the protection of their human subjects. PRIM&R recently formed a new paper entity, called the Association for the Accreditation of Human Research Protection Programs.

(Continued on p. 2)

SCIENCE POLICY ISSUES AREN'T TOPPING BUSH'S CAMPAIGN PRIORITIES

While the battle for the White House is well underway, the campaign of George W. Bush has just begun work on its science and technology policy, say two House Science Committee veterans who are helping out.

Bob Walker, the former chairman of the science panel, and self-styled advisor to the campaign, says he was assured by Bush long ago that the Texas governor is fully committed to basic science. Walker, now chairman of the Wechsler Group, a Washington lobbying firm, told a panel during a recent American Geophysical Union meeting that more work needs to be done on the specifics of Bush's policy, and sought input from the audience of physicists.

Rep. Vernon Ehlers (R-MI) is heading a team that is recruiting scientists to provide advice on the campaign, and has submitted a draft policy statement for the campaign's review. In an interview, Ehlers said Bush told him



that such a safety margin is excessive, but others might argue that it's too conservative and we don't have enough protection.

SGR. Has it been determined that the 5% annual spending level is the optimal level to provide this long-term security?

Cech. Yes. We've undertaken a strategic planning program where we have included a large number of financial projections as well as programmatic evaluations. We're about two-thirds of the way done with that process. As soon as you do these financial projections you realize that if you change the market projections a little bit, the five-year downstream effect is rather different. One of the decisions we've made is if the market continues the way it is, we are going to be announcing major new programs and major new spending initiatives almost annually over the next several years. That would be good news; we'd enjoy being able to do that.

SGR. Will these major initiatives you speak of still have to fall within this 5% disbursement cap?

Cech. Not necessarily. We may have to adjust the 5% and it may have to be adjusted upward if we find ourselves sitting on a \$20 billion endowment in a few years. At that point, we are not going to be limited to the 5%. The endowment has grown a lot and if it would shrink a bit for a temporary time it might make the president of HHMI a little nervous but it might be the right thing to do for awhile. We have to have our plan set, but we also are going to have to retain flexibility to respond on an annual basis, to recalibrate a bit.

SGR. Is there a role for HHMI and other charitable providers to fund research in politically sensitive areas, for example that involving embryonic stem cells?

Cech. There have been announcements, by the Juvenile Diabetes Foundation, for example, which is funding such research. As you know it is legal, but the derivation of stem cells is not allowable with NIH funding. If you want to get into that topic of discussion vis a vis HHMI, Bob Potter, our communications officer, is the one who is handling inquiries about embryonic stem cell research. We want to make sure to give a consistent response. It's a sensitive enough area that we want to give a very uniform and consistent view.

SGR. So sensitive that the president feels uncomfortable about talking about it?

Cech. The president likes to talk, and is still growing into the job from having been a scientist and teacher, both professions where one tends to talk a lot. Now that I'm representing HHMI, a little more care has to be taken to be sure that exactly the right words are being said.

SGR. There are some new MROs starting up—in particular the Van Andel Research Institute and the Stowers Institute. Is there a need to coordinate what all these MROs are doing to ensure that duplication isn't occurring?

Cech. There certainly is interest in the nonprofit community to have more communication so one can get cooperation, collaboration, some of the economy that might come from doing things together rather than duplication of effort in some areas. And that needs to be balanced against what is the real strength of the nonprofit community, which is the diversity of approaches. The beauty of the nonprofit world is that when it's operating at its best, it can be more experimental, more risk-taking, more focused on issues of particular interest to the donors to that particular nonprofit. Yes, more communication to avoid unnecessary duplication is a good thing, but uniformity would be a bad thing. Then you'd be in the terrible situation where all of the nonprofits together, with an annual budget of only a few percent of the NIH annual budget, wouldn't have an exciting impact on the system. If they were just adding incrementally a few percent more research dollars, then if they all dried up and blew away there wouldn't be much of a negative impact.

The other neat thing about the Van Andel and Stowers institutes is that they are making a regional impact in areas where they now provide a regional medical center. They're adding a lot of vitality to Kansas City and Grand Rapids, MI. You can argue that research can be done at just a few major places. But as soon as you start thinking about the fact that there is going to be public outreach and all kinds of educational spinoffs from the research program, then it's pretty exciting to have some of these MROs operating in places like this. Is there a limit to how many MROs can operate efficiently? Maybe it would be good to have some more regional ones in places that are not the traditional powerhouses of biomedical research. Maybe that will have a very special type of impact, which would not be duplicated by simply adding additional dollars to Harvard Medical School or Stanford.

Nonprofit Paychecks: The American Institute of Physics

A glance at the financials of the American Institute of Physics, the umbrella organization of 10 societies representing 120,000 physicists and students, shows an organization that has nearly doubled its wealth over the past few years, with net assets exceeding \$80 million at the end of 1998.

AIP's "excess"—what the commercial world calls profit—also has risen exponentially in recent years. In 1998, the most recent year for which a return on Form 990 is available, AIP reported an excess of \$12.5 million, on revenues of \$76.8 million. In 1996, the surplus was only \$7.8 million, and the year before that, \$3.5 million.

Like many other scientific nonprofits, the bulk of AIP's revenues come from its publishing operations. Subscriptions to AIP's own journals, which include such titles as Applied Physics Letters, Journal of Applied Physics, Journal of Chemical Physics, and Journal of Mathematical Physics, and to those of its member societies, such as the American Physical Society's Physical Review and Physical Review Letters, brought in \$46.6 million in 1998. Advertising in



AIP's four magazines, which include the monthly *Physics Today* sent to all members of the constituent societies, raised another \$5 million.

Marc H. Brodsky, AIP's executive director and CEO since 1993, was paid \$246,300, plus benefits of \$28,226. That's up considerably from the \$217,931 and \$27,353 he took in during 1997, but it's still at the low end of the range of pay for the chiefs of scientific societies. Richard Nicholson. executive officer of the American Association for the Advancement of Science, made \$346,407, plus \$30,774 in benefits, during 1998, although AAAS's revenues were smaller than AIP's, at \$64.6 million. And Raymond Fowler, executive director of the American Psychological Association, was paid \$229.515, plus \$127,202 in benefits, for an operation with \$76.7 million in revenues—and which operated at a small deficit that year. No one, however, comes close to the \$605,398, plus \$36,510 in benefits that went in 1997 to American Chemical Society Executive Director John Crum, who commands an operation with revenues well over \$300 million.

Number two on the AIP pay list was Darlene Walters, vice president of AIP's publishing empire. She made \$234,936 in 1998, plus benefits of \$33,064. In 1997 she was earning \$204,346 and benefits of \$31,613.

Other officers who were paid were:

James H. Stith, director of the physics program, \$133,256 and \$12,238.

Richard Baccante, treasurer and chief financial officer. \$151,044, \$26,415. Also listed for Baccante were expenses of \$24,412.

Theresa Braun, director of human resources, \$131,254, \$20,230.

Roderick M. Grant, secretary, listed as working on an "as needed" basis, \$55,279, \$4,334.

AIP's part-time directors served without pay, benefits, or expense account.

Listed as the highest-paid employees other than officers, directors, and trustees were the following, their pay and benefits:

James Donohue, publishing services director, \$147.315. \$29.743.

Margaret Judd, information technology director, \$146,346, \$26,629.

Richard Kobel, advertising/exhibits director, \$120,183, \$21,736.

Timothy Ingoldsby, product development director. \$115,000, \$23,862.

John Scott, journal publisher, \$121,507, \$6,010.

In addition, 106 other employees, from a staff numbering 590, were paid more than \$50,000.

AIP's two largest components are the American Physical Society, with about 40,000 members, and the American Geophysical Union, with 31,800. Smaller constituents are the Optical Society of America, 11,600; Acoustical Society of America, 7,200; American Association of Physics Teach-

ers, 11,600; American Astronomical Society, 6,100; American Vacuum Society, 6,000; American Association of Physicists in Medicine, 4,300; American Crystallographic Association, 2,300; and Society of Rheology, 1,800.

Previous Paychecks In This Series

(2000): National Public Radio, June 1; Federation of American Societies for Experimental Biology, May 15; American Enterprise Institute, May 1; Biotechnology Industry Organization, April 15; University of California-operated national laboratories, April 1; American Medical Association, March 15; Association of American Universities, March 1; Heritage Foundation, February 15; American Council on Education, February 1; MITRE Corp., January 15.

(1999): American Psychiatric Association, December 15; American Association for the Advancement of Science, December 1: Association of American Medical Colleges, November 15; American Psychological Association, November 1; American Chemical Society. October 15; Howard Hughes Medical Institute, October 1; National Academy of Sciences, September 15; Massachusetts Medical Society, August 15: Cato Institute, July 15; Hudson Institute, June 15; RAND, June 1; National Education Association, May 15; American Institute of Aeronautics and Astronautics, May 1; American Cancer Society. April 15; American Heart Association, April 1: Institute of Electrical and Electronics Engineers, March 15: Center for Science in the Public Interest, March 1: American Institute of Biological Sciences, February 15; UC-operated national labs, February 1; American Geophysical Union. January 15.

JOB CHANGES & APPOINTMENTS

Rear Adm. Jay M. Cohen has been appointed the chief of naval research, succeeding Rear Adm. Paul Gaffney. Cohen, who most recently has headed the Navy's Y2K office, is a Naval Academy grad with a master's degree in marine engineering and naval architecture from MIT and an extensive background in submarines. Like Gaffney. Cohen will be triple hatted, holding the additional titles of director of test and evaluation and technology requirements in the office of the chief of naval operations, as well as deputy commandant for science and technology for the Marine Corps. No word at press time whether Gaffney would take a new command or retire to pursue interests in the private sector.

E. Greg Koski, an MD-PhD and director of human research affairs for Partners HealthCare System Inc., the consortium of hospitals affiliated with Harvard Medical School, has been named to direct the Office of Human Research Protection, the newly formed entity within the Department of Health and Human Services that replaces the defunct Office of Protection from Research Risks (OPRR) at the National Institutes of Health. Koski, who will formally assume

Losing Their Religion



In college, my aspiring socialactivist friends—meritocrats from humble beginnings, all—dreamed of an education that would give them the power to make a difference in the lives of impoverished

immigrant Korean women or improve the transparency of the political campaign system. So they dutifully went to law school or enrolled in graduate programs in political science. Now, as they near graduation, some of them talk of the intellectual satisfactions of protecting major-label record companies against Internet

interlopers or of maximizing the efficiency of New York's workfare program.

What happened?

Is it that the graduates, older and wiser, have found a weakness in their adolescent dreams of social justice and democratic improvement? Or is it that the system of graduate education itself eviscerated their aspirations?

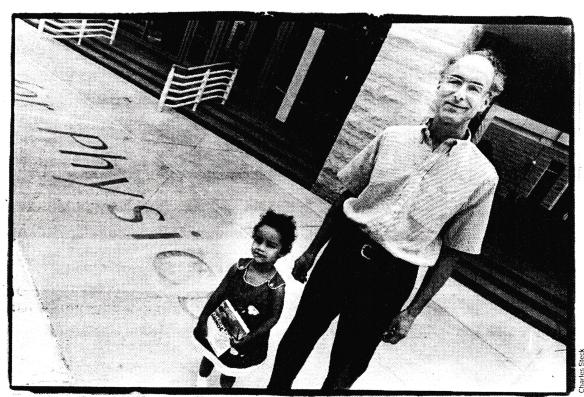
D.C. resident Jeff Schmidt would say that these newly minted professionals are still making a difference in society—just not the kind they'd once hoped to make. Indeed, he argues in Disciplined Minds: A Critical Look at Salaried Professionals and the Soul-Battering System That Shapes Their Lives (Rowman & Littlefield) that students' professional choices—and the lifetime of decisions they can look forward to making as professionals—have a more powerful impact on democracy than their votes do. The reason, he says, that 80 percent of the entering students at Harvard Law School say they want to pursue a career in public service but 90 percent take jobs at corporate law firms after graduation is that the professional world demands their "ideological discipline," or adherence to an assigned point of view. Professional education transforms not just what you know, but who you think you are as well.

Schmidt, a former editor of the College Park, Md.-based science monthly Physics Today, has collected two decades of reflection on the problem of graduate training and professional life into his 280-page book. Schmidt holds a Ph.D. in physics from the University of California, Irvine, but you don't have to be a laser jock or lab rat to see that graduate programs combine sleep deprivation, too much work, rigorous competition, social isolation, and pressure to pursue particular pathways—and force students to accept the regimen or be booted from the program. This is a strategy designed to reshape a young person's social and political preferences, says Schmidt. "[Students] enter professional training with deeply held feelings about the personal and societal promise of professional work, and during professional training struggle against what often amounts to a brutal attempt to change their very identities," he writes. The struggle of their lives, as any disgruntled associate at a law firm will tell you, is to square their beliefs with the bullying of their profession.

To lessen the conflicts, says Schmidt, the professions require that future workers be transformed while they're still trainees. These transformed employees then can "work within an assigned ideology rather than from a specific list of tasks, because the professional works with unpredictable events," says the 54-year-old author. And

so the creative work goes to those who can be trusted not to stray from the path, while more creative types often find themselves working as waiters. (Schmidt does not except journalists from his critique of the professions.)

Schmidt's effort to help grad students resist their indoctrination through such chapters as "How to Survive Professional Training with Your Values Intact" was met with some resistance at *Physics Today*. In late May, Schmidt was fired after 19 years on the job, he says, for allegedly writing the book on company time. He successfully contested that charge with the State of Maryland Department of Labor and is now collecting unemployment benefits.



We're All Dissonant Beings: Jeff Schmidt with future worker (and daughter) Joshua Rose Schmidt

"The people who were most concerned about others seemed to be the least likely to survive," says Schmidt of his time in grad school. Not much seems to have changed for him, even in the working world.

—Garance Franke-Ruta

CITYPOUNTS FREE WEEKLY NO. 20, NO. 30 JULY 28-AUG. 3, 2000

THE TEXAS OSCIVET

ODESSA SYNDROME: Living under a chemical cloud

by Greg Harman



Molly Ivins on Dubya's Version of Education Reform

Hightower on Bribery • Galbraith on Live Mikes • Mandell on Camp David Steve Kellman on New Documentaries • Chris Garlock on Stealing Time

Robert Jensen on the Dreary State of Contemporary Journalism



A Mind of One's Own

The Chains of "Professional" Employment

BY CHRIS GARLOCK

DISCIPLINED MINDS:

A Critical Look at Salaried Professionals and the Soul-Battering System that Shapes Their Lives. By Jeff Schmidt. Rowman & Littlefield. 293 pages. \$26.95.

Jeff his book is stolen." Schmidt's provocative opening to his book cost him his job: the ink was barely dry on the pages when Schmidt's employer called him in and summarily dismissed him, barely giving him enough time to pack his personal effects. Schmidt's offense was his forthright admission that Disciplined Minds had been written in part on time "stolen" from his employer. "I felt I had no choice but to do it that way," Schmidt writes in his introduction. "Like millions of others who work for a living, I was giving most of my prime time to my employer.... No one was about to hire me to pursue my own vision, especially given my irreverent attitude towards employers."

So Schmidt started spending office time writing Disciplined Minds, a book, appropriately, about "professionals, their role in society and the hidden battle over personal identity that rages in professional education and employment." The great strength and weakness — of Disciplined Minds is that it reads like a book written largely on the job: an uncomfortable see-sawing between constant glancing-over-the-shoulder nervousness and a powerful undercurrent of anger and bravado. Like the burned-out coworker who can't seem to help telling you way more than you ever wanted to know about the latest injustice from the Head Office, Schmidt has gotten hold of a very real problem, and refuses to turn loose until he's laid it out in excruciating detail. Judging by the reaction so far (see sidebar, "Work is Work"), it looks like Schmidt has hit the bull's-eye. But there's also some fairly convincing evidence out there to suggest that larger social forces may well be stirring.

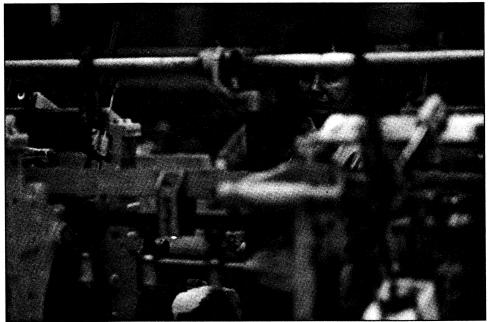
Stockbrokers are doing it. So are lawyers, rocket scientists, and doctors. Joining unions, that is. Maybe not in huge numbers yet, but then the battles in the streets of Flint began years earlier in small shops, as workers began organizing to regain control of their lives on the job. This looming struggle between workers and bosses — which will play out this time in carpeted offices amid the silent hum of air-conditioning — differs only in degree from the bloody strikes, lock-outs, and sit-ins of the last great battles over the American workplace back in the Thirties.

At the same time that blue-collar workers are once more taking to the nation's streets — janitors have blocked traffic in major cities across the nation this year in their increasingly successful quest for justice — many of America's 21 million professionals are beginning to reject the trade-off of a comfortable salary and a cushy desk job for mind-numbing meaningless work. What's going on? Unions have been a shrinking percentage of the workforce for decades now, victims of their own success, as union members ascended to the American middle class and all the middle-management ethos

that implies.

Problem is, the house, the car, and the summer vacation isn't enough any more. Never was, in fact. The battles in Flint (and elsewhere, of course; Flint serves here as a useful flashpoint and metaphor) were much more about workplace control issues — line speed and the right to organize, for example — as they were about wages and hours. "The hidden root of much career dissatisfaction is the professional's lack of control over the 'political' component of his or her creative work," argues Schmidt. Today's professionals, far from being independent, creative "partners," turn out to be just as much cogs in the machine as the blue-collar guy tightening bolts eight soul-numbing hours a day on the assembly line.

To update the metaphor, perhaps a more accurate description of the professional is as micro-processor, buried deep and invisibly in the computer innards, forever relaying instructions. "Professionals sell to their employers more than their ordinary labor power, their ability to carry out instructions," writes Schmidt. "They also sell their ideological labor power, their ability to ex-



▲ On the shop floor, wherever you are

Scott Van Osdol

tend those instructions to new situations.... Professionals implement their employers' attitudes as well as their employer's lists of instructions." In other words, unlike assembly-line workers, who only sell their blood and sweat eight hours a day, today's professionals rent out our brains, twenty-four/seven. We have become, not our own bosses — in the beloved entrepreneurial fantasy — but The Boss Him (or rarely, Her) self.

A paradox, then. Professionals are by definition independent and self-directed. (Else how could they be capable of carrying out high-level tasks such as an employer's attitudes?) Yet to be useful to employers, they must be molded as firmly as the time-and-motion directives for assembly-line workers instruct.

The answer lies in the selection, training, and accreditation of professionals. "The intellectual boot camp known as graduate or professional school, with its cold-blooded expulsions and creeping indoctrination, systematically grinds down the student's spirit and ultimately produces obedient thinkers — highly educated employees who do their assigned work," writes Schmidt, "without questioning its goals." "Professional education is a battle for the very identity of the individual, as is professional employment," he warns, in language that workers of any age of change and discontent would recognize.

Last year, as I was passing out rally leaflets at a downtown Washington Metro stop on a weekday morning, I was stunned at the steady stream of resigned faces pouring up out of the subway. Expressions of exhaustion and frustration that would have been perfectly understandable after a hard day at the office, were simply astonishing to see first thing in the morning. "An unsatisfying work life is much more than a 40hour-per week problem," Schmidt notes, "because of its profound effect on your morale while you are off the job. You may be pained to think of it as such, but your job is probably the biggest project of your life.... Thus, for all practical purposes, your life's work is at stake."

Workers of the world, unite! You have nothing to lose but your minds. □

Chris Garlock steals time professionally in Washington, D.C.

n June 26, the Maryland Department of Labor issued a ruling rejecting *Physics Today's* claim that author Jeff Schmidt engaged in misconduct on the job by writing *Disciplined Minds* while working at the magazine. The central question was why *Physics Today* fired Schmidt: the company

Stealing Time A Theory of Relativity

claimed it was because of his "misconduct," while Schmidt says that "management didn't like the radical content of the book, and was looking for an excuse to get rid of me because of my workplace activism." After an investigation, Department of Labor examiner Tasha Owens ruled that Schmidt's work on the book didn't even rise to the level of "simple misconduct," let alone the more serious "gross misconduct" or "aggravated misconduct," and awarded him full benefits, retroactive to June 4, 2000.

A key factor in the decision seems to have been that *Physics Today* never bothered asking Schmidt how much office time he spent writing the book, even though they ostensibly fired him for working on a personal project on company time. "The ruling means that *Physics Today* fired me for a reason other than 'misconduct in connection with the work," Schmidt said. "Who will see that reason as anything other than political misconduct?"

Plenty of people, apparently, and not just bosses. Responding to reports on the Schmidt firing in the National Writers Union D.C. local's weekly e-zine (which I edit), writer A. Warren wrote, "In every office I've ever worked in, it would be considered highly unprofessional to do personal work on office time, even if one's assignments were completed. It wouldn't even be tolerated in support staff, let alone writers or other professionals.

"Would Schmidt feel justified in leaving the office for the day whenever he finished his current assignments? I think not. But that's in effect what he did, whenever he worked on his book during office hours. While on company time, he had a moral (and probably legal) obligation to seek out other work-related tasks; that's what he was being paid for. Had he done so, he might have earned better performance reviews than 'satisfactory' and 'above average,' and he'd probably still have his job."

Although these sentiments were echoed in a number of other responses, many others who wrote in to defend Schmidt made the connection with blue-collar work issues explicit. "I can remember years ago my dad telling me about the crane operators that worked on the landfill in Staten Island," wrote Bill. "Their job was to load a certain number of garbage scows every day. The scows were barged out to sea, where the bottom of each one was opened and the garbage dumped to the ocean floor. When the cranemen were able to load the set number of scows in less than the eight-hour shift and wanted to go home, my dad was incensed. First, he was angry that these guys thought that they should get a day's pay for fewer hours than it took to do the job. Second, he told them that once it became known that they were being more productive that there would be an expectation that they should produce more. Perhaps management's problem was that if Schmidt could do his job in less time then maybe he could have done more...."

Jim was even more blunt in his critique: "Corporations maintain they are the judge and sole arbiter of how much time each employee must spend on work. Their lackey Congress concedes this right to them. The result is that Americans are working more hours than two decades ago, for less pay. But work time is not theirs to determine. They can ask for what they want, but the amount must be agreed to by negotiation with the workers themselves. The idea that corporations should control this work issue is dehumanizing and abhorrent."

Finally, for an interesting historical footnote on the question of "stealing time" from work, I recently ran across the following in Carl Sagan's *Broca's Brain*:

At the Patent Office, Einstein "soon learned to do his chores more efficiently and this let him snatch precious morsels of time for his own surreptitious calculations, which he guiltily hid in a drawer when footsteps approached." Such were the circumstances attending the birth of the great Relativity Theory.

"In 1905," Sagan continues, "Einstein published four research papers, the product of his spare time at the Swiss Patent Office." The papers, of course, included the famous equation $E=mc^2$ which, among other things, says that although energy and mass can neither be created nor destroyed, one form of energy or matter can be converted into another form.

Or, to put it another way, work is work. - C.G.

RICHARD RORTY'S PRAGMATIC PILGRIMAGE

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MY LIFE AT THE O.E.D

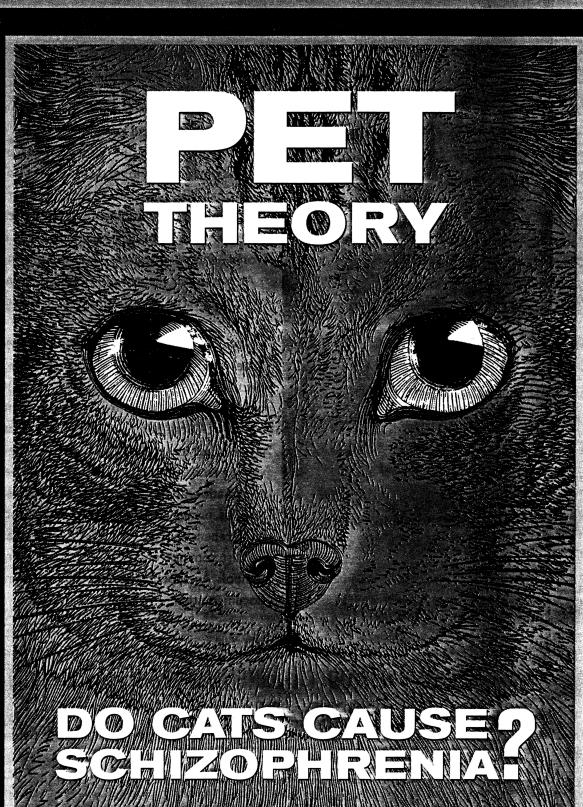
JAPAN'S SECRET TOMBS

NOBEL PRIZE FIGHT

MASTODON NATION

GEORGE W'S GARAGE BAND





Linguafranca

STEALING TIME

HOW SERIOUSLY SHOULD one take the chest-thumping rhetorical flourishes of a manifesto? Abbie Hoffman may have urged his readers to "steal this book," but surely he might have conceded that yeah, okay, he was counting on royalties. Similarly, when Jeff Schmidt pays homage to Hoffman by kicking off his recent book with the sentences "This book is stolen. Written in part on stolen time, that is," he doesn't mean it literally.

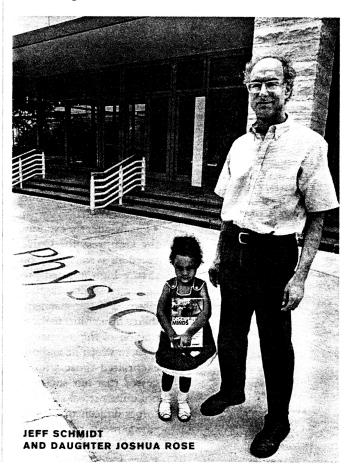
Or does he? His bosses thought so. The question now lies at the heart of a dispute between Schmidt and his former employers at Physics Today, a 121,000-circulation magazine published by the American Institute of Physics in College Park, Maryland.

In Disciplined Minds: A Critical Look at Salaried Professionals and the Soul-Battering System That Shapes Their Lives (Rowman & Littlefield), Schmidt assails the conformity that professional life demands and offers some self-help-ish tips to those sweating in their white collars. After the attention-grabbing opening line, he goes on to explain what he means by "stolen time": "Like millions of others who work for a living...my job simply didn't leave me enough energy for a major project of my own.... So, I began spending some office time on my own work, dumped my TV to reappropriate some of my spare time

at home, and wrote this book." Soon after his bosses read that, Schmidt says, they marched him to the human-resources office, had someone retrieve his personal effects, and told him that they never wanted to see him again. It was clear, they said, that he wasn't "fully engaged" in his work.

Since that unhappy day, physicists and journalists have rallied around Schmidt to try to help him get his job back. He insists he's been canned for workplace activism and the "attitude crime" of writing a subversive book. Although he adopts a rebellious stance in his book—and describes himself as a political radical—he is a good worker, he insists. He has also taken a few baby steps away from the bold

Schmidt believes he was fired for writing a subversive book while at work.



claims in his introduction. "They have a one-hour unpaid lunch period and a total of a half hour of break time," Schmidt explains. "When I was working on the book during unpaid break time, it felt as though I was working on stolen time." The publisher of Physics Today, Randolph Nanna, and the human-resources director of the American Institute of Physics declined to comment on the case. But if the "stolen time" claim was the sole reason for letting Schmidt go, the incident raises an interesting question: Can you fire an employee for what he claims to have done, without checking to see if he's bluffing?

Disciplined Minds has more to do with academia than you'd guess from its subtitle. Inveighing against the injustices visited upon salaried professionals, Schmidt takes his own profession, physics, as his main case study. He recalls that, in 1980, the head of his graduate adviser's research group at the University of California at Irvine wanted Schmidt's dissertation typed up on a rush order, just to get rid of him-Schmidt had apparently stirred up too much trouble with his criticisms of nuclear-weapons programs and his advocacy on behalf of another student who had flunked out. The high rate of attrition in physics especially caught his attention. "What I noticed was that the dropout rate was not politically neutral," he says. "To

put it bluntly, the program favored ass kissers." As does all professional training, he might add. And exposure to such pressures leads to political conformity: He claims that in 1972, the most educated Americans were the most likely to oppose withdrawal from Vietnam.

Yet do not despair, says this veteran of the 1960s (Schmidt is fifty-four), whose book is adorned with glowing blurbs from Howard Zinn, Stanley Aronowitz, and Michael Bérubé: One can carve out space for freethinking. He urges readers to lose their hunger for compliments from superiors and to "pursue your own goals while supposedly pursuing your employer's goal." Other proposals are more out there: He reprints an army manual for surviving as a prisoner of war, with the suggestion that readers mentally "substitute 'graduate or professional school' for 'PW camp."

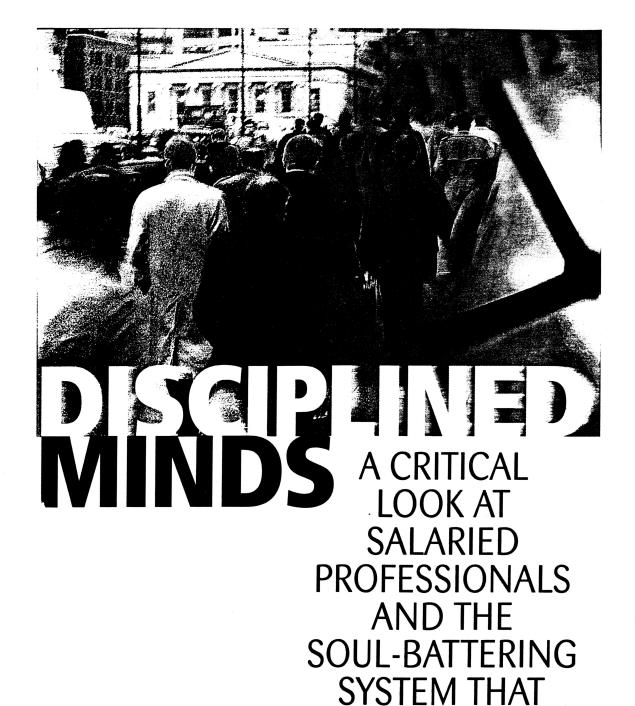
Schmidt apparently put some of these suggestions into practice. At Physics Today, he argued vociferously for such reforms as the elimination of salary inequities among editors and the hiring of members of minority groups. In 1997, after he refused to pipe down at a company retreat, he was warned, in writing, that his "destructive and counterproductive" behavior would no longer be tolerated. In the last couple of years, his performance evaluations were downgraded from superior to satisfactory, he says, yet he

insists he stayed ahead of schedule on his work. "He was their best articles editor before they fired him," says Jean Kumagai, who left *Physics Today* last year for *IEEE Spectrum*, an engineering magazine in New York.

So far, the American Institute of Physics has not been moved by Schmidt's pleas, nor by supportive letters from his friends and colleagues. Maryland's Department of Labor, however, sided with him in one important matter, granting him unemployment benefits. The agency concluded that the AIP had presented insufficient information to show that his actions constituted misconduct. According to Michael Gottesman, a specialist in labor law at the Georgetown University Law Center, however, that victory won't give Schmidt much leverage in court should he decide to sue for wrongful dismissal. States are required to prove a former employee guilty of egregious misconduct before they can deny unemployment benefits. But as an at-will employee, lacking a contract, Schmidt can be fired for any reason not barred by an employment discrimination statute-even, theoretically, for writing a dull book, not just a controversial one.

But if Schmidt did snatch a few minutes here and there to work on his book, he notes that there are compelling precedents in physics for such petty larceny. Where would physics be if Albert Einstein hadn't stolen a few moments from the Swiss Patent Office, where he was employed when he worked out the implications of relativity?

CHRISTOPHER SHEA



JEFF SCHMIDT

SHAPES THEIR

LIVES

DISCIPLINED MINDS

A CRITICAL LOOK AT SALARIED
PROFESSIONALS AND THE SOUL-BATTERING
SYSTEM THAT SHAPES THEIR LIVES

JEFF SCHMIDT

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For my daughter, Joshua Rose

INTRODUCTION

This book is stolen. Written in part on stolen time, that is I felt I had no choice but to do it that way. Like millions of others who work for a living, I was giving most of my prime time to my employer. My job simply didn't leave me enough energy for a major project of my own, and no one was about to hire me to pursue my own vision, especially given my irreverent attitude toward employers. I was working in New York Citylas an editor at a glossy science magazine, but my job, like most professional jobs, was not intellectually challenging and allowed only the most constrained creativity. I knew that if I were not contending with real intellectual challenges and exercising real creativity—and if I were not doing anything to shape the world according to my own ideals—life would be unsatisfying, not to mention stressful and unexciting. The thought of just accepting my situation seemed insane. So I began spending some office time on my own work, dumped my TV to reappropriate some of my time at home, and wrote this book. Not coincidentally, it is about professionals, their role in society, and the hidden battle over personal identity that rages in professional education and employment.

The predicament I was in will sound painfully familiar to many professionals. Indeed, generally speaking, professionals today are not happy campers. After years of worshiping work, many seemingly successful professionals are disheartened and burned out, not because of their 70-hour workweeks) but because their salaries are all they have to show for their life-consuming efforts. They long for psychic rewards, but their employers' emphasis on control and the bottom line is giving them only increased workloads, closer scrutiny by management and unprecedented anxiety about job security. In this way the cold reality of employer priorities has led to personal crises for many of this country's 21 million professionals.

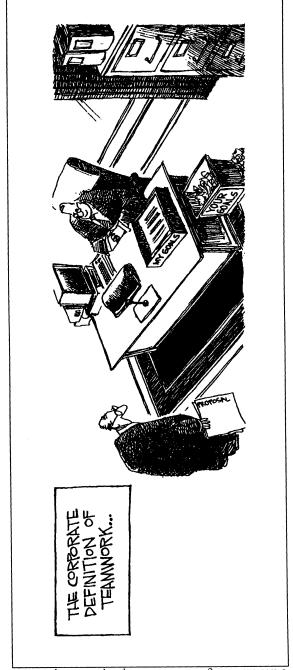
Burned-out professionals may not be immediately obvious to the casual observer, because typically they stay on the job and maintain their usual high level of output. But they feel like they are just going through the motions. They have less genuine curiosity about their work, feel less motivated to do it and get less

The problem shows no sign of easing. In fact, the ranks of troubled professionals are swelling as members of Generation X finish school and rack up a few years in the workforce. Many Xers, having observed the unfulfilling work ethic of their baby boom predecessors, want their own working lives to be fun and meaningful from the get-go. Starting out with priorities that took boomers a decade to figure out, but in no better position to act on those priorities, Xers are simply having career crises at an earlier age. Clearly, there is an urgent need to understand why career work so often fails to fulfill its promise.

I argue that the hidden root of much career dissatisfaction is the professional's lack of control over the "political" component of his or her creative work. Explaining this component is a major focus of this book. Today's disillusioned professionals entered their fields expecting to do work that would "make a difference" in the world and add meaning to their lives. In this book I show that, in fact, professional education and employment push people to accept a role in which they do *not* make a significant difference, a politically subordinate role. I describe how the intellectual boot camp known as graduate or professional school, with its cold-blooded expulsions and creeping indoctrination, systematically grinds down the student's spirit and ultimately produces obedient thinkers—highly educated employees who do their assigned work without questioning its goals. I call upon students and professionals to engage in just such questioning, not only for their own happiness, but for society's sake as well.

This book shows that professional education is a battle for the very identity of the individual, as is professional employment. It shows how students and working professionals face intense pressure to compromise their ideals and sideline their commitment to work for a better world. And it explores what individuals can do to resist this pressure, hold on to their values and pursue their social visions. People usually don't think of school and work in terms of such a high-stakes struggle. But if they did, they would be able to explain why so many professional training programs seem more abusive than enlightening, and why so many jobs seem more frustrating than fulfilling.

I decided to write this book when I was in graduate school myself, getting a PhD in physics, and was upset to see many of the best people dropping out or



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Non Sequitur by Wiley

being kicked out. Simply put, those students most concerned about others were the most likely to disappear, whereas their self-centered, narrowly focused peers were set for success. The most friendly, sympathetic and loyal individuals, those who stubbornly continued to value human contact, were handicapped in the competition. They were at a disadvantage not only because their attention was divided, but also because their beliefs about big-picture issues such as justice and social impact caused them to stop, think and question. Their hesitation and contemplation slowed them down, tempered their enthusiasm and drew attention to their deviant priorities, putting them at a disadvantage relative to their unquestioning, gung-ho classmates. Employers, too, I realized, favored people who kept their concerns about the big picture nicely under control, always in a position of secondary importance relative to the assigned work at hand. Thus I saw education and employment as a self-consistent, but deeply flawed, system. I wrote this book in the hope of exposing the problem more completely and thereby forcing change.

A system that turns potentially independent thinkers into politically subordinate clones is as bad for society as it is for the stunted individuals. It bolsters the power of the corporations and other hierarchical organizations, undermining democracy. As I will explain in detail, it does this by producing people who are useful to hierarchies, and only to hierarchies: uncritical employees ready and able to extend the reach of their employers' will. At the same time, a system in which individuals do not make a significant difference at their point of deepest involvement in society—that is, at work—undermines efforts to build a culture of real democracy. And in a subordinating system, organizations are more likely to shortchange or even abuse clients, because employees who know their place are not effective at challenging their employers' policies, even when those policies adversely affect the quality of their own work on behalf of clients.

This book is intended for a broad range of professionals, nonprofessionals and students, and for anyone interested in how today's society works. It is for students who wonder why graduate or professional school is so abusive. It is for nonprofessionals who wonder why the professionals at work are so often insufferable, and who want to be treated with greater respect. It is for socially concerned professionals who wonder why their liberal colleagues behave so damn conservatively in the workplace. (Chapter 1 explains how professionals are fundamentally conservative even though liberalism is the dominant ideology in the professions.) It is for individuals who are frustrated by the restrictions on their work and troubled by the resulting role they play—or don't play—in the world. It is also for those who simply find their careers much less fulfilling than they had expected and aren't exactly sure why.

Disillusioned lawyers, doctors, financial analysts, journalists, teachers, social workers, scientists, engineers and other highly educated employees are looking for a deeper understanding of why their lives are stressful and feel incomplete. My hope is that readers will find such an understanding in these pages, along with effective strategies for corrective action. If you are a professional, coming

to understand the political nature of what you do, as part of an honest reassessment of what it really means to be a professional, can be liberating. It can help you recover your long-forgotten social goals and begin to pursue them immediately, giving your life greater meaning and eliminating a major source of stress. It can help you become a savvy player in the workplace and reclaim some lost autonomy. And, ironically, it can help you command greater respect from management and receive greater recognition and reward, without necessarily working harder.

If you are a student, understanding the political nature of professional work can help you hold on to your values and moral integrity as you navigate the minefields of professional training and, later, employment. For students trying to get through professional training intact, this book can serve as something of a survival guide, explaining the frightening experiences and warning of what lies in store.

If you are a nonprofessional, you experience even more lack of control, unfulfilling work, insecurity and other sources of stress than do professionals. As a consequence, the toll on your physical and psychological well-being is even greater than that suffered by professionals. If you want to act individually or collectively to improve your situation, then it pays to know what makes your professional coworkers tick. Such awareness can help you figure out which people you can trust and how far you can trust them. When professional and non-professional employees maintain solidarity in the workplace, they can cover for each other and get more concessions from their employer. But any alliance between unequal partners is doubly risky for the less powerful party—in this case the nonprofessionals, who are at the bottom of the workplace hierarchy. By understanding professionals, you reduce the chances of being double-crossed by them. You'll be treated with more respect, too.

Whatever your occupation, you have to deal with a variety of professionals when you are off the job. Most of these professionals work for others, not directly for you. Whether you visit an HMO, send kids to school, request a government service, see a counselor, get assistance from a social worker, deal with a lawyer, file a consumer complaint or contact a local TV station or newspaper, understanding the political nature of professional work will help you get better service. If you are involved in an independent organization working for social change, you have to contend not only with professionals in the corporations or agencies that your group confronts, but also with professionals advising your own organization. Groups that simply trust professionals without truly understanding them are very likely to be misdirected or sold out by those professionals.

And, of course, everyone deals with professionals indirectly, too. For instance, newspapers, magazines, radio and television are filled with supposedly objective news reports, analyses and studies prepared by professionals. What should you believe? To truly understand the output of these or other professionals, you first need to understand the political nature of the professional's role at work.

6

The political nature of professional work is this book's unifying theme. To make the case that the professional's work is inherently political, I examine not only professionals and what they do (part one: chapters 1 to 6), but also the system that prepares them to do it (part two: chapters 7 to 13) and the battle that one must fight to be politically independent (part three: chapters 14 to 16).

My hope is that whether you are a professional, a nonprofessional or a student, you will find here an unsettling but empowering new way of looking at yourself, your colleagues, the institution that employs or trains you, and society as a whole. This book strives to arm you with a very practical analytical tool that you can use to your advantage in whatever individual and collective struggles you find yourself in as an employee, student, organization member, consumer or citizen.

A note on pronouns. To make less frequent use of phrases such as "he or she," in part one I will sometimes use female pronouns instead, and in part two I will sometimes use male pronouns instead. Today most professionals are women, and the female majority, which stood at 53% in 1997, is growing. Women have long made up large majorities in professions with relatively low social status and salary; thus teachers, social workers, registered nurses and librarians have been said to labor in the subprofessions. But today the proportion of women is increasing throughout the professions. Nearly half the students now in medical school and law school, for example, are women, up from about 9% in 1970.

A note on references. Many of the references listed at the end of each chapter make for fascinating reading. I encourage you to look further into topics in this book that interest you, and so I have given lots of references and have spelled things out to make them as easy as possible to look up. Time spent with these materials will surely be thought provoking, informative and entertaining.

PART ONE

PROFESSIONALS

Protest by 16 former Physics Today employees

21 June 2000

Marc Brodsky, Executive Director American Institute of Physics One Physics Ellipse College Park, Maryland 20740

Dear Dr. Brodsky:

We were dismayed to learn of the recent dismissal of Jeff Schmidt, who had been an articles editor at *Physics Today* magazine for over 19 years. As former employees of the magazine, we urge you to reconsider your decision.

As we understand it, Jeff was fired after the publication of his book, Disciplined Minds, and in particular after AIP managers heard about the book's opening lines: "This book is stolen. Written in part on stolen time, that is." According to Jeff's supervisor, Stephen Benka, this intentionally provocative statement proved that Jeff was not "fully engaged" at the magazine.

Under different circumstances, we might find some humor in the fact that Jeff's declaration, obviously made for dramatic effect, would create such a stir. But there's much more at stake here: you have chosen to deprive Jeff of his livelihood. We take deep exception to that.

Whether Jeff — or, for that matter, anybody else at *Physics Today* — was "fully engaged" is really immaterial. What counts, or what should count, is that Jeff did his work for the magazine, and AIP invariably gave him above-average or satisfactory ratings in his performance reviews. Your recent discovery that Jeff used his spare time for critical writing, rather than surfing the Net, exchanging personal e-mail, or other common diversions, shouldn't be cause for punitive action. It's also worth noting that the use of one's spare time at the office to work on a book is a time-honored tradition among journalists. Indeed, many employers encourage it, recognizing that it boosts the professional standing of their employees and enhances the reputation of the organization.

We have all worked with Jeff, and we know him to be a talented and conscientious editor. While at *Physics Today*, we benefited from his camaraderie, support, and good ideas. Authors who worked with Jeff, as well as *PT* staff members themselves, will tell you that Jeff performed his duties with admirable skill and efficiency. He is a clear, careful journalist, and he has a deep interest in physics and in the social issues surrounding it. What is more, he worked hard to improve the work environment at the magazine. *Physics Today* has been a better place for his presence.

It is our strong belief that you erred in firing Jeff. We therefore urge you to give him his job back.

Respectfully,

Paul Elliott (Alexandria, Virginia)

Daniel Gladstone (Southold, New York)

Alexander Hellemans (Naples, Italy)

Jesse Hochstadt (Providence, Rhode Island)

Marlowe Hood (Paris, France)

Jay Iorio (Bedminster, New Jersey)

Pat Janowski (Portland, Oregon)

Jean Kumagai (Brooklyn, New York)

Margaret Marynowski (Brookline, Massachusetts)

Chris Mohr (San Francisco, California)

Madhusree Mukerjee (Queens, New York)

Corey Powell (Brooklyn, New York)

Matthew Siegel (Brooklyn, New York)

Sharon Singletary-Smith (Bellport, New York)

William Sweet (Brooklyn, New York)

(one name withheld by request)

Protest by National Writers Union (UAW)

NATIONAL WRITERS UNION PROTESTS FIRING OF JEFF SCHMIDT

Contact: Jonathan Tasini (212) 254-0279

New York, June 12, 2000 — The National Writers Union today protested the firing of Jeff Schmidt, a Writers Union member, from his job as a staff editor at *Physics Today* magazine, a step that was apparently taken in response to the recent publication of a controversial book that Schmidt wrote. "The firing of Schmidt is an affront to the principles of open inquiry and free speech that a magazine of science such as *Physics Today* is supposed to uphold," said Writers Union President Jonathan Tasini.

On May 31, Schmidt, a member of the Washington, D.C., local of the Writers Union, was suddenly fired after 19 years on the staff of *Physics Today*, which is published by the non-profit American Institute of Physics. The dismissal came, Schmidt says, right after his supervisors learned that he had written a book called DISCIPLINED MINDS, which was published last month by Rowman & Littlefield. An article about the book had appeared in the *Chronicle of Higher Education* and was making the rounds at the offices of *Physics Today*.

Schmidt admits that his book, whose subtitle is "A Critical Look at Salaried Professionals and the Soul-Battering System that Shapes their Lives," was written in a provocative tone. In fact, in the book's opening lines, he declares that the book was "written in part on stolen time," i.e., during free time at the office. Schmidt sees his dismissal from *Physics Today* "as further proof of the book's thesis: that management's paramount concern is always the political content of the work — even spare-time work."

"The content of Schmidt's book does not justify the actions of *Physics Today* management," Tasini stated. "Schmidt has a right to be provocative in his outside writing without suffering the loss of his job."

The National Writers Union, Local 1981 of the United Auto Workers, is a labor union and advocacy organization for freelance journalists, authors, technical writers, poets and other types of writers.

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Protest by journalist and former Physics Today employee Marlowe Hood

June 15, 2000

Randolph A. Nanna Publisher Physics Today One Physics Ellipse College Park, Maryland 20740

Dear Mr. Nanna:

What did you gain by firing Jeff Schmidt? I am flummoxed by this question as I consider all the things you damaged or lost: *Physics Today*'s most competent articles editor; the magazine's perennially fragile collective morale; and, most flagrantly, AIP's public image and credibility. Let's take these one by one.

Unless another blue-pencil virtuoso of even greater talent has joined the staff since my year-long stint with the magazine in the early 1990s, Jeff was the best articles editor you ever had or are likely to have. (I've spent more hours than I care to count doing the same thing, so I know whereof I speak.) Not only does he edit with an all-too-rare technical precision, he has an uncanny ability to coax even the most prickly of authors toward clarity and coherence. Titles and hubris do not cow him, and he is doggedly but politely persistent. Ask any of the hundreds of authors who have benefited from his patient — dare I use the word — professionalism. Jeff would no doubt bristle at such a compliment, but what else does one call the ability to perform consistently at such high levels even if one is, assuming for a moment that your inference from his book is correct, less than "fully engaged" in one's work? Indeed, what more can you ask of an articles editor — even one with a PhD — except that he do his job well? Is it reasonable to also demand devotion? Do you even have the right to?

If misuse of company time is the principal crime for which Jeff has been tried and convicted, then I can assure you that — during the time I worked in the same office — he was far from the most egregious offender. Others must come forward on their own, but I certainly can speak for myself: not only did I spend time researching and writing a weekly column for a major daily newspaper while sitting at my desk, the staff spent a fair amount of time discussing the topics I chose. It was no secret. I did every scrap of work that was given to me as soon as it was given to me. But I reclaimed the time left over as my own.

As for the morale of the magazine's staff, what did you anticipate the impact of dismissing Jeff would be? Is this intended as a lesson to his erstwhile colleagues? If so, the lesson will probably have backfired. Do you expect that things will run more smoothly now that you are rid of this alleged rabble rouser? Jeff was open and above-board in his efforts to improve, as he saw it, the work environment at *Physics Today*. One could disagree with his ideas, as I sometimes did, but still respect the integrity and aim of his efforts. The fact that neither these activities nor the writing of his book interfered with his contractual duties is evident from his long-term tenure at the magazine.

Finally, it is AIP's credibility that will suffer most. How can an organization purporting to represent the highest form of science summarily dismiss a proven employee of long standing without an inquiry or even offering him the chance to defend or explain himself? Where is the scientific method in that? Did it ever occur to you to ask *how much* time Jeff actually "stole" or whether the opening line to his book was simply an attention-grabbing, rhetorical flourish? I'm sorry to put it so bluntly, but the whole sorry affair makes you look just plain bad, and it will not pass unnoticed. The article in the *Chronicle of Higher Education* is only a foretaste of the interest this episode is likely to generate.

In the end, you will, I am convinced, regret firing Jeff Schmidt and frog-marching him out the door. Alas, it will probably be for the wrong reasons.

Sincerely,

Marlowe Hood

Editor, Agence France Presse

Maître de Conference, French Press Institute (Sorbonne)
55bis Quai de Valmy, 75010 Paris, France

cc: Marc H. Brodsky, James H. Stith

M. V. Ramana

Protest by physicist

24 June 2000

Marc Brodsky, Executive Director American Institute of Physics One Physics Ellipse College Park, Maryland 20740

Dear Dr. Brodsky:

I am writing to protest the firing of Dr. Jeff Schmidt, apparently in response to the publication of his book, *Disciplined Minds*. This action is an affront to free speech and open, critical inquiry. It is especially unfortunate that this should happen at a science magazine. Whatever I have seen of Dr. Schmidt's work has been of very high standard and I understand that he consistently received above-average or satisfactory ratings in his performance reviews. As long as employees do their jobs properly, what they do in their spare time should be of no concern to the employer.

I urge you to reconsider your decision and to reinstate Dr. Schmidt. Thank you.

Sincerely,

M. V. Ramana

Center for Energy and Environmental Studies Princeton University



Protest by management professor and former Physics Today employee

A Current Example of Irresponsible,

Unaccountable Management

Denis F. Cioffi Draft 1.27, 26 June 2000 Comments & links welcome.

Why do managers get paid more than workers when they don't know how to manage?

I teach project management at the graduate level at George Washington University, but a few years ago I worked at <u>Physics Today</u> magazine. Until recently that experience had given me few management stories for the classroom. (The one minor exception is when the editor-in-chief told me that seven of my eight possible stories for the next month were a priority.) Now, though, the <u>American Institute of Physics</u>, the organization that publishes PT, has provided a stellar example for my colleagues and students.

Jeff Schmidt, an articles editor at the magazine, was fired on 31 May 2000 after his managers learned that he had written a book, <u>Disciplined Minds: A Critical Look at Salaried Professionals and the Soul-Battering System That Shapes Their Lives</u>. For 19 years at PT, Schmidt received satisfactory or above-average performance ratings. I wanted to post this article before reading his book because the content of the book is irrelevant to my arguments. However, the book must be worthwhile, or why would AIP have given it such good publicity?

But AIP claims the book's contents are irrelevant to its views too. A story in the *Chronicle of Higher Education* (9 June 2000) relates that AIP, speaking through its director of human resources, Ms. Theresa C. Braun, is certain that Dr. Schmidt (who has a Ph.D. in physics) was not terminated "because of the general content of the book." Oh.

As reported in the *Chronicle*, and as Dr. Schmidt confirmed to me, he was told that his creation shows he wasn't "fully engaged" at *Physics Today*. In the management books and articles I have read, I have never encountered the "fully engaged" criterion, so I am not sure what it means.

Maybe Sue Shellenbarger knows. In a recent Wall Street Journal article (21 June 2000), "Workplace Upheavals Seem to Be Eroding Employees' Trust," she cites a recent study of 7500 employees that found only half

trusting their senior managers. What if that fraction applies to employees of the *Journal*? I hope Ms. Shellenbarger is "fully engaged" (and not just dating?), or perhaps she will be fired soon, too.

PT and AIP management made their strange pronouncement because Dr. Schmidt begins his book with the provocative statement that it was written in part on time "stolen" from his employers -- that is, he used his spare time at the office to work on the book. The managers for whom Dr. Schmidt worked are evidently so uncertain of their own estimates of their employees' efforts that they wish to depend solely on cursory worker self-characterizations. By this management method, Dr. Schmidt's salary should have been doubled if he had instead confessed that he was so overwhelmed that he needed 75 hours to get his work done each week (the PT standard work week is 37.5 hours).

I asked PT's soon-to-be most famous ex-employee if management had tried to quantify the "stolen" time, but they had not. So let us do a calculation for them and begin by accusing Dr. Schmidt of thinking about the book at the office, even if he was not working on it directly, from the time he started at PT. Let's continue to assume that he gave PT 90 percent of his time, which is a fraction larger than management books recommend when estimating the productivity of a typical worker. At that rate, Dr. Schmidt would have spent approximately 3500 hours on the book at the office, which is probably enough time to have produced it.

With this perspective, we see clearly Dr. Schmidt's problem: he's focused. If instead he had frittered away time the way most of us do -- personal email, Web surfing, telephone calls, watercooler jokes, long lunches, workouts at the gym, theoretical physics calculations ("get that guy Einstein out of the Patent Office -- he's not fully engaged!") -- he would not have to account for it. And I used a work-time to spare-time ratio higher than studies have shown to be realistic, so perhaps we should be asking Dr. Schmidt why he has not written two books.

But what if he spent a much greater fraction of his time on the book? Suppose he did PT's work only 10 percent of the time, and he spent 90 percent of his time on the book. Dr. Schmidt has always received satisfactory or above-average performance ratings. In fact, at the time of the firing, he was two months ahead in his work, having completed his annual work quota in ten months' time -- a quota that his managers specified in writing. How efficient is this guy? They should promote him! They should have him teach everyone else in the office how to work so well! If he's only working 10 percent of the time, they could write the magazine in two or three days and take the rest of the month off. Is this discovery -- and after only 19 years -- great or what?

Responsible Management

. . .

Peter Drucker wrote in 1973 that the ideal of the professional manager had become reality, and that the essence of the professional manager was

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responsibility. Among many other concepts needed for managing projects, I teach about quality, estimating, and goals. Below I examine briefly the responsibility inherent in these three concepts in the context of The Schmidt Affair.

Quality comprises the quality of the product and the quality of management. The quality of Dr. Schmidt's editing has been judged better than satisfactory for 19 years. The hundreds of scientists whose articles he has edited and with whom he has collaborated have been pleased to work with him for 19 years. Before firing Dr. Schmidt, PT had not indicated a change in the quality of his work. Will *Physics Today* be recalling all the articles edited by Dr. Schmidt because of a just-discovered defect?

Will PT and AIP now examine the quality of their management? After their peremptory firing of Dr. Schmidt, will all the managers who have given him good reviews for 19 years be fired? Because they are managers, I suppose they should fire themselves. I do not see how they can avoid it, because surely they bear more responsibility -- one can tell by the larger size of their paychecks -- and the only logical inference from Dr. Schmidt's firing is that they have erred grievously.

Managers must estimate the time needed for project tasks. Dr. Schmidt is apparently more efficient than his managers required -- which is curious because his managers had performed the same type of work before they were promoted. Is it possible that Dr. Schmidt works better than they? Why did they not offer him a big raise when he finished 12 months' worth of work in 10 months? Why has the publication of Dr. Schmidt's book not forced them to question their own skills?

Dr. Schmidt was paid to do a job, and he did it well. Why have the managers not considered involving him more fully in the production of the magazine? It couldn't be because they would have to pay him more, could it? It couldn't be because they would have to give up some power and admit that maybe they are not as good at managing as they thought, could it?

Projects fail most frequently because of ill-defined missions. Do the managers at PT understand the goal in publishing a magazine? Is it to put out a good magazine every month, which Jeff Schmidt has helped them do for 19 years, or is it to control the spare time that we all use at the office?

The Right Course Can Still Be Chosen

I would like to remove the "Ir-" and the "Un-" from the title and praise AIP. I could do it if the AIP and PT managers would take a step back, admit they made a mistake, concede that they need someone as good as Jeff Schmidt at their magazine, and offer him his job back.

They could then proclaim their independence and security boldly, saying, "As long as you get your job done, we don't care what you do." They would have the proof of Dr. Schmidt's book on which to rest their assertion.

If they could do that, they would have creative people knocking down their doors, and the magazine might just become an exciting place to work. When I was at PT, management led me to believe that I was being considered for the position of editor-in-chief. This possibility pleased some of my colleagues, for as Dr. Schmidt put it, "you think work should be fun -- and then it's not work."

That's always been my idea of a healthy workplace, and as a management educator, I am hardly alone in this view. Shortly before his death in 1993, W. Edwards Deming, the American management icon (who, coincidentally, had a Ph.D. in mathematical physics from Yale University), reiterated his belief that much in the American system of management crushes motivation, self-esteem, and dignity. I say that if such stereotypical managers, including those of our current example, will not try to reverse their irresponsible tendencies, laugh at their follies, and correct their mistakes, they should go "fully engage" themselves.

Postscript: My Emailed note to Dr. Marc Brodsky, head of AIP

Dear Dr. Brodsky:

As a professor in the Department of Management Science at The George Washington University, I have posted a management educator's perspective of The Schmidt Affair on my website, www.toad.net/~dcioffi. Please allow me to remove the "Ir-" and "Un-" from the title by offering Dr. Jeff Schmidt his job back.

Very truly yours,

Denis F. Cioffi, Ph.D.

HOME

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Please send intelligent comments to dcioffi@gwu.edu.

You can contact <u>Dr. Jeff Schmidt</u> directly or through <u>Disciplined Minds</u>. You can send email to <u>Dr. Marc Brodsky</u>, Executive Director of the American Institute of Physics.

Thomas Nagy

Protest by business school professor.

26 June 2000

Marc Brodsky, Executive Director American Institute of Physics One Physics Ellipse College Park, Maryland 20740

Dear Dr. Brodsky:

I strongly endorse the position of my colleague, Dr. Cioffi, that Dr. Schmidt's job should be returned to him.

With the resurrection of Star(t) Wars, American science's own Lysenko affair, it becomes imperative that principled dissent to official folly be cherished rather than liquidated.

Sincerely,

Thomas J. Nagy, Ph.D.

Associate Professor of Expert Systems George Washington University

Kajoli Krishnan

Protest by Physicist

26 June 2000

Marc Brodsky, Executive Director American Institute of Physics One Physics Ellipse College Park, Maryland 20740

Dear Dr. Brodsky:

Science would not have flourished and evolved beyond Ptolemy if the free spirit of inquiry had been curbed. It is a pity that an institution that supports and thrives on scientific research and progress should act in a manner so regressive as to fire an employee for his intellectual honesty and expression. This act reeks of the insecurity that can possess only the intolerant and the orthodox. One cannot expect it from the American Institute of Physics. I do hope that AIP will change her mind and take Jeff Schmidt back.

Kajoli Krishnan

Physicist Bangalore, India

Vikram Vyas

Protest by physicist

28 June 2000

Marc Brodsky, Executive Director American Institute of Physics One Physics Ellipse College Park, Maryland 20740

Daniel Kleppner, Chair, Physics Today Advisory Committee Department of Physics Massachusetts Institute of Technology Cambridge, MA 02139

Dear Dr. Marc Brodsky and Prof. Daniel Kleppner,

Recently a friend informed me of the firing of Jeff Schmidt. After reading the relevant material available to me I strongly feel that this act goes against everything that we as physicists stand for.

It reminded me of physicist Richard Feynman's Caltech commencement address of 1974:

"So I have just one wish for you — the good luck to be somewhere where you are free to maintain the kind of integrity I have described, and where you do not feel forced by a need to maintain your position in the organization, or financial support, or so on, to lose your integrity. May you have that freedom."

I do appeal to you that Jeff, too, may have the freedom that Feynman wished for all of us.

Yours sincerely,

Dr. Vikram Vyas

http://indev.nic.in/ajit/

International Centre for Theoretical Physics Trieste, Italy and The Ajit Foundation 396 Vasundhara Colony Tonk Road Jaipur 302 018 India

Surendra Gadekar

Protest by physicist

30 June 2000

Marc Brodsky, Executive Director American Institute of Physics One Physics Ellipse College Park, Maryland 20740

Dear Mr. Brodsky,

Physics Today has been for many people like me a source of good reading. Many are the pleasant hours that I spent in the library at the Indian Institute of Technology, Kanpur, and at the library at Iowa State University (where I did my postdoc) reading the journal. But a journal can maintain high journalistic standards if and only if the people working on it are joyful and not afraid of adverse consequences in case their free-time activity displeases their bosses.

Your action terminating the services of Jeff Schmidt for "not being fully engaged" with the journal smacks of vindictiveness. If Mr. Schmidt had been incompetent or not giving his best to the journal, surely you could have found that out sometime sooner than after 19 years. To a disengaged observer like me it seems that you have not been fully engaged in the journal or else it would not have taken you so long.

The very fact that you found Mr. Schmidt's performance perfectly satisfactory for so many years shows that your action is prompted more to set an example to others in the organization. It is an action that is bound to result in the deterioration of the quality of writing at *Physics Today*.

This letter is an appeal to you to reconsider your hasty step and restore Mr. Jeff Schmidt to his job. That action would not undo all the damage caused, but at least it would be a step in the right direction.

Sincerely,

Dr. Surendra Gadekar

Sampoorna Kranti Vidyalaya Vedchhi 394641 India Publisher of *Anumukti*, South Asia's only anti-nuclear magazine

Historical note by National Writers Union member

Was the theory of relativity written in part on stolen time? From *Writer's Bloc Online*, the newsletter of the Washington, D.C., local of the National Writers Union . . .

THE SCHMIDT FIRING: A HISTORICAL PERSPECTIVE?

By Chris Garlock, editor

For an interesting historical footnote on the question of "stealing time" from work, I recently ran across the following in Carl Sagan's *Broca's Brain*:

"At the Patent Office, Einstein 'soon learned to do his chores more efficiently and this let him snatch precious morsels of time for his own surreptitious calculations, which he guiltily hid in a drawer when footsteps approached.' Such were the circumstances attending the birth of the great Relativity Theory."

"In 1905," Sagan continues, "Einstein published four research papers, the product of his spare time at the Swiss Patent Office." The papers of course, included the famous equation, $E=mc^2$, which, among other things, says that although energy and mass can neither be created nor destroyed, one form of energy or matter can be converted into another form.

Or, to put it another way, work is work.

5 July 2000

Protest by sociologist

Paul Bryant

2 November 2000

Marc Brodsky, Executive Director American Institute of Physics One Physics Ellipse College Park, Maryland 20740

Dear Mr. Brodsky:

As an enthusiastic reader of Jeff Schmidt's book, Disciplined Minds, I wish to thank you for verifying in practice the theoretical premise of that book by firing Schmidt as quickly upon its publication as you did. Despite the academy's successful manipulation of contemporary minds regarding the purpose and integrity of academia, repressive actions such as yours have historically assured that the greatest minds among us receive the legacy of praise they deserve, while those who devote their limited time on earth to hindering progressive thinking receive the scornful obscurity they have so rightfully earned. (No one remembers the names of those who sentenced Socrates to death, Galileo to excommunication or Thoreau to jail. But everyone remembers the names Socrates, Galileo and Thoreau!)

Dr. Schmidt may disagree with me (I've never communicated with the man), and I have no desire to further damage his family's livelihood as your action has, but I for one hope you do not hire him back, so that he may devote himself full-time to exposing the ridiculously tragic illusion modern academia has manufactured, to our generation's ultimate humiliation. Long after the arrogant, pretentious articles in *Physics Today* and other academic journals are reduced to museum relics of a time when The Peter Principle dominated society, *Disciplined Minds* will rank among the greatest extant sociological studies of an era in which pointless politics flourished and human purpose nearly became extinct.

Sincerely,

Paul Bryant Sociologist Lawrence, Kansas Statement from Physics Today Editor Stephen G. Benka to Physics Today staff promising to base job security on job performance

From:

Stephen Benka

To:

ALL-PT

Date:

17 Nov 1996 (Sun) 18:24

Subject:

Job Security

TO: All PT Staff FROM: Steve Benka SUBJECT: Job Security

Item number 1 on the anonymous agenda expresses concern about speaking one's mind.

Nobody's job will be jeopardized by speaking freely and airing their views on matters pertinent to the magazine. I actively encourage the expression of views that may differ from my own. It is by pooling all of our individual experience, all of our individual creativity, all of our individual ideas and resources that we can get to the root causes of our concerns, and find solutions. Freedom to talk to each other about them is essential. I caution us all, however, to focus our energies and discussions on the issues --- not on the personalities involved. Certainly personal attacks are not productive.

I repeat. The retreat, and Physics Today in general, is a 'safe' place for such discussions.

There are, however, no guarantees of lifetime employment at AIP for any of us, from the Publisher on down (and up). We all have jobs to do, and we must do them well.

Basing job security on job performance is sound. That won't change.

Former coworkers who may be able to provide further information

Jean A. Kumagai 152 Bedford Avenue #2R Brooklyn, NY 11211-2066

212-419-7551 (w) 718-387-4943 (h) jak@interport.net

Paul Elliott

Street Alexandria, VA 22312

703-@aol.com

Toni Feder 1413 North Mangum Street

Durham, NC 27701

919-688-6257 tfeder@wam.umd.edu

22 Oct. 96

Graham —

Please add these two items to the agenda for Thursday's meeting:

- Staff participation in hiring
- Need for additional staff

Thanks,

Jeff

```
From:
                   Jean Kumagai <jak@interport.net>
To:
                   ACP.AIP(pelliot,tfeder,jschmidt)
Date:
                   22 Oct 1996 (Tue) 16:50
Subject:
                   Re: Meetings
>To:Graham Collins <gcollins@aip.org>
>From:jak@interport.net (Jean Kumagai)
>Subject:Re: Meetings
>Hi, Graham
>I'd like to add two items to the staff meeting agenda on Thursday:
>First, I think we should include in the discussion of Ray's departure the
>staff's participation in hiring.
>Second, we should discuss our need for additional staff.
>Also, can we get a summary of the advisory committee's preliminary
>feedback before the meeting?
>Thanks,
>Jean
>
```

From:

Toni Feder

To:

Date:

GCOLLINS 23 Oct 1996 (Wed) 8:57

Subject:

mtg

Hi Graham,

Agenda items for Thursday's meeting:

I think we should discuss staff participation in the hiring process, as well as the need for increasing staff size.

Thanks,

Toni

From:

Graham Collins

To:

TFEDER

Date:

23 Oct 1996 (Wed) 10:13

Subject:

mtg -Reply

You've been talking to Jeff and Jean, haven't you?

OK, I'll add it.

I apologise again about how Carol told you that you were now doing the books screening. If you had been around last week when Ray and I discussed it we would have immediately gone to you to discuss it as a proposal. Instead we reached the conclusion that there really didn't seem to be any other workable option. My intent was to raise it with you as a proposal, with the expectation that we would reach the same conclusion. And I thought I had made it clear to Carol that because I hadn't yet discussed it with you, she shouldn't raise it with you yet.

-- Graham

Dear Members of the Physics Today Advisory Committee:

Some members of the Physics Today staff urge you to spend part of today looking into a matter that has become of deep concern to us since the last Advisory Committee meeting and especially in the last few months.

What concerns us is the increasingly repressive work environment at the magazine.

Please use the brief account that follows as a basis for confidential discussions with staff members. We are confident that you will be able to corroborate its fundamental points.

We regret having to be the nonundersigned here, but in the year since the last Advisory Committee meeting, we have been increasingly subjected by management to verbal abuse, direct threats of dismissal and warnings about speaking out in front of both Physics Today managers and others outside of Physics Today.

Please keep this memo -- but certainly not the topic -- within the confines of the Committee.

Freer Atmosphere Needed at Physics Today

At Physics Today there is an increasingly repressive atmosphere that discourages staff initiatives to improve the magazine and that discourages creative work.

Events before, during and after the 25 September 1997 staff retreat have contributed to the problem.

In July, Marc Brodsky held a meeting with the Physics Today staff, apparently to hear what we had to say about present conditions. During the meeting, Graham Collins brought up a number of problems; some needed changes were made as a result. However, within a few days of the meeting with Marc, Graham was lectured at length by Charles Harris, who repeatedly stated how important it is for the staff to "speak with one voice." The message was quite clear: Do not complain.

In subsequent conversations with other staff members, Charles reiterated the call to "speak with one voice" when dealing with AIP upper management and, interestingly, with the Physics Today Advisory Committee. A month before the retreat, Steve Benka and Charles Harris invited the staff to suggest topics for discussion (as they had done at last November's retreat). Many of us did so enthusiastically. One evening several days before the retreat, Charles rounded up several of the editors who happened to be in the office, to present his version of the retreat agenda. To the surprise and disappointment of those present, none of the major suggestions put forth by the staff was on it. Instead, the eight-hour retreat was to lead off with three and a half hours of reports on what each department in the magazine does. Several people argued that, rather than sitting through such presentations, everyone's time might be better spent discussing problems and solutions.

The following day, Charles issued a slightly revised retreat agenda to the entire staff. As before, a number of people (including several who had been excluded from the ad hoc after-hours meeting) objected to the departmental reports, and asked that the staff's suggested agenda topics be included. But Charles refused to change the agenda, and he grew increasingly angry with staff members who tried to discuss the agenda with him -- even though he had invited us to help set the agenda in the first place.

After setting such an uninspiring agenda, Charles declared attendance at the retreat mandatory for all editors. In contrast, attendance at the previous retreat had been optional, yet everyone had attended; we had been inspired to attend by the feeling that the meeting really was an opportunity to make a difference.

At the 25 September retreat, Charles Harris and Steve Benka spoke first, saying some provocative things about the magazine's organization, mission and content. When they finished, Jeff Schmidt asked if we could ask questions, and Charles said no. This was a surprise to all of us, especially because of our assumptions about the nature of retreats. Jeff suggested that we should be allowed to ask questions. Charles said that the agenda permitted questions "later." Another staff member, not finding such an item on the written agenda, asked where it was, and Charles repeated himself, saying only that it was there, "later." ("Later" never came.) When Jeff tried to say something, Charles demanded that Jeff be silent, repeatedly shouting, "That's an order! That's an order!" Charles's outburst stunned the staff, and some later commented that they felt like resigning.

During the departmental reports that followed, a few staff members departed from their prepared text to criticize Charles for his behavior; others agreed but were too afraid to say so openly. As a result, Charles adopted a somewhat more open attitude.

After the retreat, however, Charles lectured Jeff (a physicist in his 17th year as a PT editor) on how to follow orders, and gave him a written notice that called Jeff's

questioning of the surprise no-questions policy an "interruption." The notice strongly implied that Jeff would be fired the next time he says anything that Charles considers to be "counterproductive." This notice amounts to a gag order, because no one can know for sure what Charles might consider to be counterproductive. Though directed at Jeff, the gag order by extension applies to all of us; the chilling effect is already evident.

Both Jeff and Graham have been outspoken about problems that many of us see at the magazine. We feel that the lecture to Graham and the written notice to Jeff both contribute to a repressive atmosphere at the magazine and restrict all of us. We hope the advisory committee will do whatever it can to get these warnings retracted, and to remind the PT managers that repression is counterproductive. Such steps would go a long way toward diminishing the fear that staff members now associate with trying to openly address problems at the magazine.

From: To: "Jeff Schmidt" <jschmidt@aip.acp.org>
ACP.ACPgate("bgl@worldnet.att.net")

Date: Subject: 16 Jul 1998 (Thu) 14:27 Guilty -- but not as charged

Dear Barbara,

Many people have been asking me what response I got to my performance review appeal. So here's a summary.

As you recall, my appeal stated that compared to the previous review period, I did more work and more innovative work. Yet Physics Today publisher Charles Harris and editor Stephen Benka rated my job performance lower. (They lowered my rating from above average to average.)

As you also know, my appeal had two parts. The first part challenged the accuracy of what the managers wrote about my job performance. It argued that what they wrote ranged from grossly understated praise to completely contrived examples of deficient work. I refuted the allegations and falsehoods point by point, drawing on the written record of what had happened. The second part of my appeal offered an obvious explanation for the unfair assessment: It was a response to my speaking out about staff concerns and working with other staff members to address those concerns.

I submitted my appeal to Jim Stith (Harris's supervisor) and Terri Braun (American Institute of Physics Director of Human Resources). For two months I heard nothing. Then, just recently, Stith met with me to convey AIP's decision. Our two-hour meeting focused on both the performance review and my severe written criticisms of it.

Stith did not defend the performance review's faint praise or its negative statements about me. Nor did he take issue with my detailed claim that the review makes many false statements about me. Nevertheless, Stith told me that he had decided to leave all of these statements on my performance review (and thus in my permanent personnel record) without making any changes at all. He explained that he had talked to Harris and Benka, and they had told him other things about me, things not mentioned in the written review, and these things justified the lowering of my job performance rating. I asked him what these things were, but he declined to say. I pressed him hard to tell me, of course, but he refused to do so, saying that he didn't want to get into the details. "So you found me 'Guilty -- but not as charged,' and you won't tell me the real charges," I said to Stith. "This is Kafkaesque." He did not respond.

Although Stith refused to reveal any specific examples of my supposedly deficient job performance, he did identify my problematic work in general terms. And the problem was clearly my organizing activity, just as I had claimed in my appeal. Stith told me that when you do things that your supervisors would be happier that you not do, then you have to be willing to pay the penalty, even if what you do is right. I disagreed, of course. He told me that for a time in his younger days he challenged the status quo. He said that even after the status quo yielded to change, he still had to pay a price for his actions, implying that paying such a price was right.

I told Stith that I expect him to make sure that people are not punished for doing the right thing. But he made it clear that he will not play that appellate role at AIP. He is evidently willing to back other managers even at the expense of justice. This continues the recently imposed love-it-or-leave-it policy at Physics Today, which has cost us three coworkers in the last few months and will continue to drive away talent until it is lifted. Finally, Stith offered a simple formula for professional success at Physics Today. Each member of the Physics Today staff should work hard to figure out what Benka wants, and then do that, he advised.

As you can see, my appeal of the statements made about me on my performance review has not yet been handled adequately. The next step will depend on suggestions that I get from you and other coworkers.

Jeff

Hot Type

STEAL THIS BOOK: Jeff Schmidt did. "This book is stolen," the *Physics Today* magazine editor declares at the beginning of his new work, which he wrote on the job when his bosses weren't looking. "Written on stolen time, that is."

Mr. Schmidt acknowledges that at first glance, his book could also be seen as an exercise in bait-and-switch. With the title, *Disciplined Minds*, in bold letters on the spine, and the category "Careers" stamped on the back cover, the book will no doubt attract the attention of hard-working professionals eager for an edge over their competitors—we mean, colleagues.

But Mr. Schmidt's subtitle—A Critical Look at Salaried Professionals and the Soul-Battering System That Shapes Their Lives—tells a different tale.

He envisions the readers of Disciplined Minds (Rowman & Littlefield) not as ladderclimbing careerists, but as "dissatisfied professionals and disillusioned graduate students—the majority."

Maybe you can identify. Mr. Schmidt believes that most people enter the work world or graduate school with the belief that their labor will be of social value. More often, they find that it's of only economic value—and not primarily to them. The hierarchies of professionalism leave them alone on their ladders, afraid to make a change.

If that sounds bleak, he has the solution. After examining the worlds of work and education with an eye for the political, he concludes with "Now or Never," a 33-point manifesto for changing the world, or at least your office.

It's not rocket science, says Mr. Schmidt, who earned his Ph.D. from the University of California at Irvine. Form a union, fight elitism, and "undermine management's information advantage."

Sound like hard work? You're already doing it. For laborers in academe, Mr. Schmidt recommends reading "the weekly intelligence report for university bosses," *The Chronicle of Higher Education*.

-D. W. MILLER AND JEFF SHARLET

Excerpt from Physics Today Advisory Committee report

From:

Stephen Benka

To: Date: ALL-PT

Date:

15 Nov 1996 (Fri) 17:08 Advisory Committee report

The PT Advisory Committee report is here. More grist for the mill. --Steve

Marc Brodsky, Executive Director & CEO John Rigden, Director of Physics Programs Charles Harris, Publisher Stephen Benka, Associate Editor

Please find attached the final version of the 1996 Report of the Advisory Committee of PHYSICS TODAY. This report is written in the spirit of providing the committee members' best advice to the management of PHYSICS TODAY to further develop and strengthen PHYSICS TODAY as the flagship publication of the AIP.

We are submitting the text of the report by e-mail as well as by regular mail in the hope that it reaches you in time for your planned off-site meeting.

In the name of all committee members, I thank the staff of PHYSICS TODAY for their hospitality during the October 4-5 meeting and their frankness in interactions with us.

With best wishes, Horst Stormer

ps: A set of miscellaneous suggestions will be submitted by separate mail.

PHYSICS TODAY ADVISORY COMMITTEE MEETING (1996)

The 1996 Meeting of the PHYSICS TODAY Advisory Committee was held in the American Center of Physics building in College Park, Maryland on October 4-5, 1996. The meeting started at 8:50 a.m. and lasted until approximately 5:00 p.m. on Friday, October 4. On Saturday, October 5, the Committee members met in an executive session and briefed Marc Brodsky, Charles Harris and Stephen Benka on the Committee's recommendations. John Rigden was unable to participate.

The attendees during the Friday session were:

COMMITTEE MEMBERS: Don Anderson, Lawrence Crum, James Deye, Maurice Jacob, Larry Kirkpatrick, Dan Kleppner, Kumar Patel, Horst Stormer (chair) and Virginia Trimble.

PHYSICS TODAY: Stephen Benka, Graham Collins, Paul Elliott, Toni Feder, Charles Harris, Irwin Goodwin, Abby Klar, Richard Kobel, Warren Kornberg, Jean Kumagai, Ray Ladbury, Barbara Levi, Gloria Lubkin, Elliot Plotkin, Jeffrey Schmidt, Bertram Schwarzschild,

AMERICAN INSTITUTE OF PHYSICS: Marc Brodsky

During the October 1996 Meeting the Advisory Committee experimented with a new agenda. Previous meetings were held in plenary-fashion with all staff members and all committee members assembled throughout the Friday session. This year the Committee met sequentially

tracking of information about what is scheduled for upcoming issues and changes made in the schedule (current information should be maintained electronically), (ii) changes in format, style, and content of the magazine. The committee believes that it would be a positive step for management to inform the staff that formal attention is being devoted to improvement of management skills.

c. Inequities in salaries -- Staff believes that pay rates in some cases are not proportionate to the kind of work done, the amount of work done, and seniority levels. Some attention should be given to a perceived inequity in part of the salary structure.

3. Poor Internal Vertical Communications:

As noted in last year's Committee Report, it was "felt there are some real or potential communication gaps, both among staff and the outside world". Alarming new evidence of internal communication problems arose in our talks with staff this year; especially with regard to vertical communications. Lateral communications amongst staff, on the other hand, seems to be open to the point that some are even aware of one anothers' salaries. With this channel so open and the management not aware and involved, one has a situation which breeds misinformation, rumors, and real or perceived grievances. The committee heard comments such as: "a lot of communications are concealed", "AIP management is willing to sacrifice quality for dollars", "there is only criticism from management", "there is significant inequity in editorial salaries", "management doesn't have a full array of skills", and "management is only willing to project a congratulatory image of physics".

We were also made aware of incidents which were indicative of an authoritarian style of management; e.g., hiring personnel without any consultation of those who will be working closely with the individual, changes in meeting schedules on short notice without regard to the impact this may have on those below, and managers taking management skills training without sharing this fact with the staff. In this last case, such sharing would help to alleviate the staff perception that management is lacking in such skills and just does not care. These or similar themes were common enough to indicate a problem which is a large contributor to poor morale and, hence, reduces efficiency of staff. The problem with vertical flow of information even exists at the higher levels where there was evidence that AIP management may not be sending clear and consistent messages to PT management; and hence PT management may not be able to adequately explain these issues to the PT staff. One example of a frustrating AIP communication's issue was the shutdown of PINET which caused a significant waste of time for some PT staff because it was not communicated very effectively. These sorts of problems have resulted in a "we(PT) vs they(AIP)" bunker mentality which can only disrupt communications even further.

Our recommendations concern three distinct communications channels:

- a. AIP to/from PT: There needs to be a consistent set of management goals established which deal with the issues of PT autonomy, both editorially and financially. Once agreed to, these policies should the communicated to staff and then consistently adhered to. At the very least the goals need to address AIP's long term commitment to PT, the expected quality and purpose of the publication, the openness of AIP management to the concerns of PT staff and its willingness to hear those concerns.
- b. PT managers to/from PT staff: A mechanism should be put into place to build trust and the flow of information. This may entail a greater use of e-mail to communicate (almost real time) the contents memo for upcoming issues and other operations memos in addition to more frequent staff meetings even if held by phone. PT management should empower employees by

Jeff,

We welcome constructive and productive contributions from you, but behavior by you that we consider destructive and counterproductive will no longer be tolerated. Your continued interruption at our retreat, after you were instructed to hold your questions and comments until the discussion segment of the agenda, is an example of what we mean. The continuation of such behavior on your part, in the office or at any work-related activity, will not be tolerated.

This notice is to be treated as confidential.

ceh 9/24/97 From:

Graham Collins

To: Date: JBARKER, CDAY, PELLIOT, TFEDER, SFUNK, apsdpost.GO...

Date: Subject: 28 Oct 1997 (Tue) 12:38 My coming silence -Reply

Irwin Goodwin replied to my message "My coming silence" as follows. He has kindly given me permission to distribute his reply to PT staff members. I also append my message, for the benefit of the two staff members who I did not include on my original routing list.

-- Graham

>>> Irwin Goodwin 10/26/97 07:02am >>>

Your memo alarms me. I recall hearing your remark, and as lawyers often say, it seemed like eminently fair comment. Editorial meetings or, for that matter, any meetings around the office, will lose their purpose if the ruling you cite is imposed or implemented. Lest it is forgotten, freedom of speech is the cornerstone of journalism.

I understand that a similar muzzle was placed on another member of the staff a few weeks ago.

Have we come to this?

Irwin

<<<<<

>>> Graham Collins 10/24/97 06:45pm >>>

If you notice that I no longer say very much during staff meetings, it is because I have been firmly instructed not to criticise Steve Benka or Charles Harris during staff meetings. I am only permitted to criticise them in private discussions with them.

Since this instruction was conveyed to me because I made a truthful statement of fact at our 11 a.m. meeting on Wednesday (namely, that Charles, Lewis and Megan went to Lane Press, but Elliot, Rita and I did not, and Elliot, Rita and I have the most experience setting equations for PT), I have to interpret "criticise" very broadly. Consequently there will be very little for me to say at meetings.

-- Graham

PS: My absence on Monday will be because I have a vacation day scheduled.

CC:

SBENKA, CHARRIS

Coworker Graham Collins's report of gag order on him

Report of meeting at which staff got management to agree to rescind both gag orders

From: Charles Harris

To: pt

1 Dec 1997 (Mon) 18:16

Subject: November 1997 Monthly Staff Meeting

This memo summarizes what we discussed at the meeting, with emphasis on the major topics discussed, conclusions reached, and action items agreed upon.

It's an effort to maintain communications and reduce misunderstandings among us, help keep us on track in terms of what we--individually and collectively--say we're going to do, and inform the PTers who weren't at the meeting.

I (or a volunteer) will prepare the same kind of summary memo after each of the subsequent monthly meetings. At the next meeting, let's discuss the usefulness of such memos, and whether this basic form should be modified.

TOPICS DISCUSSED

The principal topic we discussed (as agreed to at the outset) was communications.

Gloria led off the discussion by stating that the staff needs to know what's being planned and done regarding such matters as staffing, budgeting, management policies and plans that affect PT, and the member societies' attitudes toward PT.

Her remarks prompted discussion of the staff's involvement in the planning of the editorial calendar. Some people felt that the editors should be more involved in the process. I said I had no problem with that.

We then turned to the matter of staffing. Points made included the following:

- o PT currently has a tight budget that does not call for either staff expansion or staff reduction.
- o Some relief could be obtained by allocating some of Rita's salary to TIP and advertising (as is already done with mine and Carol's).
- o Rita currently has too much work to do, and needs relief. We briefly discussed ways of providing Rita -- and also Susan and Carol -- with assistance, but no specific decisions were explored.
- o Ray Ladbury will be writing Search stories on a part-time basis and as a part-time employee. His involvement will not increase the number of Search stories we run, in that Barbara and Gloria will be writing fewer Search stories for a while as they concentrate on other things. Nor will Ray's involvement have an impact on our freelance budget.
- o I noted that our current freelance budget is about \$22,000, and we discussed the possibility of using it in part to pay for the services of an outside copyeditor. One suggestion made was to use such a person to relieve Jean of her copyediting duties.

There followed an extended discussion of staff communications, specifically what I should communicate to the staff, when I should do so, and in how much detail. Points made included the following:

- o How much detail? The issue was left unresolved, but one suggestion was that in some cases the staff simply needed to be informed that a matter was under consideration.
- o I said I would provide the staff with more information than I have, but that I would continue to withhold certain confidential materials.
- o It was suggested that PT managers should trust the staff more, as well as provide information sooner and better (as could have been done vis-a-vis the contents of the special issues decided last spring). It was also suggested that the staff can contribute to what PT managers are doing (for example, with regard to the APS task force).
- o I volunteered to do a better job of communicating with the staff, and one of the ways I will do so -- with Carol's help -- is by making more use of our e-mail system. I also invited the staff to follow up with me on specific issues they have raised with me. In addition, I said I would arrange to have e-mail access to PT when I'm off-site (something I don't have now).

- o We briefly discussed the "firewall" approach to management, under which managers try to shield staff from higher management.
- o In terms of the APS task force to evaluate PT, I said that I have learned who's on the task force and will share that information with the staff. I also noted that my goal is to fend off outside influences on PT and PT editors, and Marc Brodsky supports that position.
- o We engaged in an extended, open, and either spirited or acrimonious (take your pick) discussion of the dual issues of free speech and the basic rules of conduct, as well as the related events and difficulties that we have experienced over the past two months. In this case, we did reach agreement: That we will put the past behind us and stop exchanging accusations and counteraccusations; that we will abide by the basic agreement we had reached at our first monthly meeting, on 15 October, regarding rules of conduct, as slightly modified at this meeting (see below); and that this modified code of behavior supersedes all else on this subject that PT managers have communicated, formally and informally, verbally and in writing, to all or some members of the staff. I individually polled all of us present, in person or on the phone (absent were Bert, Irwin, and Steve), and we all agreed to abide by this arrangement. (In addition, I said I would send private memos to Graham and Jeff to rescind earlier directives.)

CONCLUSIONS REACHED

- 1. I will try to keep the staff better informed, with Carol's assistance, and will use e-mail more as a means of staff-wide communication, along with our regular monthly meetings.
- 2. Our agreed-upon code of behavior -- for staff and managers alike -- is that all of us will be respectful, tolerant, and courteous in dealing with one another, and that we are free to engage in constructive criticism and discussion without fear of retribution.

ACTION ITEMS

- 1. I'll communicate better, and also get myself equipped with remote e-mail access.
- 2. I'll send the staff a memo about the APS task force members.
- 3. I'll give private memos to Jeff and Graham as promised.
- 4. We'll all abide by the code of behavior.
- 5. We'll meet again for our third monthly meeting, on Monday, 15 December, from 10 a.m. to noon.

Rescindment of gag order on coworker Graham Collins

Subject: FYI: rescindment

Date: Wed, 03 Dec 1997 09:48:35 -0500 **From:** "Graham P. Collins" < gpc@sff.net>

To: jak@interport.net, ar429@lafn.org, tfeder@wam.umd.edu, lugenbold@juno.com

FYI, here is how CH & SB rescinded my gag order. It came from CH's account, with the name in the From field changed to include both their names.

```
>>> Charles Harris, Steve Benka (Charles Harris) 12/02/97 12:27pm >>>
> 
>** PRIVATE **
```

>As agreed in the last staff meeting, our mutual acceptance of a code of >behavior supersedes any outstanding verbal or written reprimand to you >or any member of the staff for any perceived violation of this code. >Onward and upward!

About 45 minutes later, I replied with the following (to both CH and SB, including a copy of the above message).

```
>Thank you.
```

>(The contentious part of the reprimand in question related to a violation of >a different, previously unstated code, but I'll accept this statement in the >spirit intended.)

I suspect that they labored mightily over the wording of the rescindment (it did, after all, take them nearly 3 weeks), and yet they got it wrong. I shake my head in dismay.

-- Graham

Rescindment of gag order on me

From: Charles Harris, Steve Benka (Charles Harris) (Charles Harris)

To: JSCHMIDT

Date: 2 Dec 1997 (Tue) 12:30

Subject: rescindment

As agreed in the last staff meeting, our mutual acceptance of a code of behavior supersedes any outstanding verbal or written reprimand to you or any member of the staff for any perceived violation of this code. Onward and upward!

Excerpt from a letter I wrote to a comorker on vacation describing the ban on private conversations between Physics Today staff members
4 February 1998

Hi Graham,

It sounds like you are in a great place, a different world physically and in spirit. News travels far and fast, and so I see that you already know that your coworkers have been treated to a "down under" experience of a very different sort. The description of events that you received was a good one, in my opinion, and shows the skills of a good reporter. I'll give you my report here, because it contains some additional information.

On Thursday 22 January 1998 I met with Charles Harris to ask him to get Stephen Benka off my case. Benka had been pressuring me to stop doing anything that takes up any support staff time at all. I told Harris that support staff can contribute a lot to making the editorial work go well, and that his apparent new policy for support staff work -that it should give priority to advertising and other revenue-producing work over editorial work -- was bad for the magazine. When Judy was part of the support staff, most of her time was shifted to the Buyers' Guide, which was brought in-house to save money. Now they are shifting more and more of Rita's time to advertising work. And they aren't replacing the lost editorial support. Instead, they are pressuring editorial staff to take on more work. Management philosophy seems to be: Why pay \$15 an hour for clerical work when you can pay \$30? Their real philosophy, of course, is simply to get the editorial staff to do more.

I told Harris that behind all this is the way his salary is structured -- tied to reducing the magazine's budget deficit. To my claim that his salary structure is distorting our priorities, he said that he doesn't always do what is best for his salary. As proof, he pointed out that we usually don't run four feature articles in the magazine. He then quickly changed the subject, realizing, I think, that he has never revealed that his salary is tied to upping our output to four articles per month. By the way, over my objection (and over Bert's indication of support for my objection), they are running four substantial feature articles in the March issue, even though we have no backlog and no additional staff. The other day Harris broke new ground in his privileging of advertising over editorial by bringing his advertising manager to an editorial meeting and letting the needs of advertising set the agenda. forced the meeting to make a big editorial decision after very little discussion, for the sake of advertising. Warren objected strongly; Gloria called it "bullying."

Harris told me that he is open to hiring more support staff, but that we would have to discuss it first at a staff meeting, possibly the next one. I told him that some of us thought we had already discussed it at length at staff meetings and that the need was clear.

Overall, Harris said that he wasn't inclined to give me much consideration, because of my organizing activity last

year. And he mentioned your name here too, Graham, as another unforgivable transgressor. "You tried to get me fired," he said, speaking either about me alone, or about you and me, or about all those involved. I said that isn't true. He said that if I believe that, then I must be very naive. And his attitude indicated that he doesn't think I believe that and that he doesn't want to even consider the possibility that I do. I think he wants to believe that I tried to get him fired, because according to his value system that would give him both the desire and moral right to fire me or drive me out, which now appears to be his agenda.

In pursuit of that agenda, Harris appears to have given Benka license to go after me and maybe all of management's perceived enemies on the staff. Around 6 pm on Wednesday 28 January 1998, I was in my office talking to Toni on the telephone when Benka opened the door and asked rudely and sarcastically if I was talking to one of our authors. said, "No, I'm talking to a coworker, Toni." He acted as if he already knew that. He stepped further into my office and said that he wanted in on our conversation. I found this shocking, of course, and unprecedented. I switched Toni to the speakerphone and told her that Steve was here and wanted to be in on our conversation. She sounded equally shocked. Benka suggested that she come over to my office, and she said OK. Without saying anything, I walked out of my office and into the open area of desks just outside, and Benka followed. I did this to make room for Toni and to get some physical distance between myself and a former post office employee who was clearly behaving very strangely. Toni arrived quickly.

Benka asked me and Toni what we had been talking about on the telephone. I thought his question was way out of line, but I nevertheless told him: We had been discussing the May 1998 50th anniversary issue of Physics Today. (That is ironic, because every May-issue meeting that Benka has been a part of has been a disaster. Virtually every member of the staff thinks that that issue has been badly mismanaged, and no one thinks that yet another meeting with Benka is the way to generate the ideas that the magazine desperately needs to salvage it.) But after giving that short answer, I said that the important question is why he was trying to barge in on our conversation.

He said that he is forbidding all private conversations between staff members at work. From now on, all conversations between staff members must be open to management supervision, he said. When I asked him why, he referred to the organizing activity that took place last year and said that he doesn't want that to happen again. (He and Harris have no doubt that I played a leading role in that.) This looked like a retaliatory and repressive policy aimed more at me than at the rest of the staff, and so I

asked him whether or not it applies to everyone. He said it does. I didn't believe him (but I didn't say that I didn't believe him), and so I pressed him three or four times to say whether or not he was going to announce the new policy to the rest of the staff. His final statement was that he knows that I want to know that.

Of course, even if the new repressive policy is not formally announced, no one can afford to take a chance on violating it -- especially Toni and me, to whom it was announced formally. (Paul got a semi-formal announcement, as the discussion took place right outside his door, which was open at the time.) News of management's dim view of private conversations has spread throughout the staff by way of -- yes, you guessed it -- private conversations.

Even though Benka's Gestapo-like enforcement of the new policy was very frightening, in the middle of it all Toni managed to point out that we don't have the bi-weekly Q&A meetings anymore. If management wants to know what the staff is concerned about, they can have such meetings rather than monitor our conversations. Benka ignored her. I think Toni's idea is a good one and should be among our arguments and suggestions.

About half an hour before Benka busted up the telephone conversation between Toni and me, he did something that in retrospect was clearly part of the new repression but at the time felt merely strange and creepy. I had stopped by Toni's office to give her a newspaper article that I thought might interest her. It was about the Clinton/Lewinsky affair, which we had discussed earlier in the day. article was a brief historical survey showing that presidents who cheated on their wives were more likely to lie to the public as well, justifying public interest in this sort of thing. Toni and I discussed the article briefly and then discussed the 50th anniversary issue. During the latter discussion, Benka opened the door to Toni's office, entered the room and asked if he could join in the conversation. This seemed very strange, of course, . especially because he did not know what we were talking Toni was perfectly polite in spite of Benka's rude about. She pointed out the article that I had brought by, dutifully restarting our conversation about it from the beginning for Benka. The three of us discussed the issue for a while, during which Toni and I were treated to editor Benka's view that the press should know its place and not try the president. It was an awkward discussion, because I and maybe Toni (she can speak for herself) were not really interested in speaking with Benka. When we finished the discussion, Benka showed no sign of leaving Toni's office. He indicated in a subtle but clear way that he would not leave first. This was not only bizarre, but also had something of an ugly edge to it. Although we had no idea what was going on, Toni and I acted quickly to undo the

situation -- she by immediately announcing that she had work to do, and I by quickly leaving the room. Benka and I then spoke about feature articles for ten minutes or so at his office. That conversation consisted of me detailing for him all the progress I had made on a number of articles. discussion was pleasant, although not really necessary, and he acted pleased and calm throughout. However, when we finished talking, I walked toward Toni's office, and Benka followed me. He asked if I was going to Toni's office, and I said yes. He asked if he could come along. By that time he had already followed me most of the way to her office. I told him that she and I were in the middle of a conversation that we had started earlier in the day, and that it would take too long to fill him in on all the background. discussed this briefly, and he finally suggested that neither one of us go to Toni's office. I didn't say anything one way or the other, and he went back to his office. I noticed a box nearby containing copies of the latest issue of the magazine; I took one and went back to my office. Later, when Toni and I spoke on the telephone about the 50th anniversary issue, we began our conversation by trying, without success, to figure out our supervisor's mysterious and disturbing behavior earlier.

To: Theresa Braun, Director of Human Resources, and James Stith, Director of Physics Programs, American Institute of Physics

From: Jeff Schmidt, Senior Associate Editor, Physics Today

Subject: My 1998 performance review

I am writing to ask that my 1998 performance review be redone. Physics Today editor Stephen Benka wrote the review under the direction of Physics Today publisher Charles Harris. I discussed the review with Benka, who, after consulting with Harris, refused to make any of the revisions that I requested. Therefore I am appealing to you to produce a new review.

The review was not conducted in accord with American Institute of Physics policy or procedures, and the result is not a fair assessment of my work as a feature articles editor at AIP's Physics Today magazine. I am asking you to produce a new review not just in the interest of accuracy, but also as a necessary affirmation that in the future the American Institute of Physics will treat its employees fairly.

The review lowers my performance rating from last year's "4" ("Exceeds Job Requirements") to a "3" ("Meets Job Requirements") even though this year I did more work and more innovative work. Producing feature articles for the monthly magazine is a team effort, and I think that the many staff members with whom I work will testify that my work is better than average.

The biased review that I received is punishment for my organizing activity at the magazine. It is one of a number of recent reprisals for -- and moves to stop -- such activity, in which I have played a leading role in the interest of both the magazine's staff and the physics community. The central retaliatory feature of the review is that it makes what it admits are "new demands," which amount to a sharp increase in my workload.

I have had 17 performance reviews since I began working at Physics Today in March 1981, but until now I have never needed to write a response to one. This time, however, not only is the review inaccurate, but my supervisor, editor Benka, presented it to me with the attitude that performance reviews at AIP are not done with employees, but are done to them. This violates both the letter and the spirit of AIP policy. He acted as if he were not permitted to change the review in any significant way, and so his discussion of its contents was only pro forma.

In this memo I will first describe some of the ways in which the review is inaccurate, and then I will explain how

it is a reprisal for my organizing activity and part of a series of recent attempts to stop me from engaging in any further collective activity at the magazine.

Review inaccurate

I will go over every sentence of the performance review and show how the review plays down or completely leaves out my accomplishments while contriving deficiencies and playing them up. The review has four sections: three sections focusing on my major areas of work responsibility and one section of additional comments.

Article editing

Concerning my article editing work, the review states that "Jeff's articles are generally ready on time and are often early." This plays down my accomplishments and does so deliberately, because management keeps records of deadlines and work-completion dates and is fully aware of what I have done in this regard. The words "generally ready on time" must be changed, because my articles were always ready on time and never delayed an issue of the magazine. And the words "often early" must also be changed, because my articles were almost always early and were often very early.

This is not to say that management can reasonably hold me responsible for the final completion dates of the articles that I work on. They cannot, because the publication process depends upon the work of the magazine's editor and many coworkers, over whom I have no authority. What my review should note is that I always did my part as fast or faster than can reasonably be expected, and certainly much faster than average. At one point during the year, for example, I had two feature articles ready to go to the printer more than a month before the deadline (discussed further in the following two paragraphs). As far as anyone can remember, this had never been accomplished before at Physics Today. My articles came close to the deadline only when the editor failed to meet his deadline for obtaining the articles and giving them to me to edit. I ask that you rewrite this part of my performance review and increase the numerical rating to reflect the resulting more accurate appraisal. I am asking you to do this not just to make my review more accurate, but also to assert that it is not AIP policy to begrudge an employee praise when it is due, even if AIP has a grudge against that employee.

On the issue of deadlines, I would like AIP to use its own performance as the standard for comparison. AIP gave me my performance review more than five weeks late, missing its mid-February deadline and then not even completing the review by the middle of the following month. Benka dated my review 12 March, signed it on 23 March and gave it to me on 24 March.

One big reason that I did more work this year than last year was because management stated that it wanted the magazine to have a backlog of feature articles that were edited and completely ready to be sent to the printer. I supported this goal and produced such articles, but this unprecedented accomplishment is not mentioned in my performance review. Management is fully aware of my accomplishment, as evidenced by the fact that they praised it at a staff meeting.

Working way ahead of the deadline has the potential advantage of avoiding some major inefficiencies (described in the following paragraph), but doing so turned out to involve extra work, because although management asked for and praised the result, they did not support the effort while it was underway. It was left to me to bring about the changes in the workplace necessary to work ahead. editor consistently maintained a crisis mentality, always giving priority to work for the next issue -- which he always worried would be late -- over work for future issues. Because the work of most employees on a forthcoming issue doesn't end until around the time that the issue goes to press, the editor, with his crisis priorities, never deemed it reasonable to work on later issues. I was able to accomplish management's goal of completing work ahead of schedule only by working directly with the staff team that actually does the work (Rita Wehrenberg, editorial assistance; Paul Elliott, copy editing; Elliot Plotkin, art work; Judy Barker, proof reading; Carol Lucas, photo permissions), and carefully avoiding coming to the overly insecure editor with questions of work priority. to add this accomplishment to my performance review and raise the numerical rating to reflect the resulting less biased appraisal. I ask you to do this not only to make my performance review more accurate, but also as a way of saying that AIP does not condone biased appraisals of employees.

Another big reason I did more work this year was the inefficiency caused by the magazine's periodic exhaustion of its supply of feature article manuscripts that are ready to edit for publication. It is Benka's responsibility to obtain articles for the magazine. The shortage of articles resulted in a very uneven work flow and forced me to edit some articles close to the deadline, which often meant editing in parallel with the author's making revisions. It is easy for the editor to say "just work in parallel," but such work often necessitates reediting material that the author changes and discarding edited material that the author removes, and a host of other problems. The shortage of articles led me to write to the editor in the middle of the year asking for more work. (See attached memo of 18 August 1997.)

The numbers given in the performance review are all wrong. The review says that this year I "was asked to produce 16-18 articles." In fact, the agreed upon rate was initially 16 per year, not "16-18," the precise meaning of which is not at all clear since there presumably is no upper limit. Benka and I later in the year agreed to reduce the annual rate to 14 and increase the amount of work that I do in areas other than editing, yet the number "14" never appears in my performance review. I ask you to correct this.

As far as the article editing part of my job goes, my production rate is supposed to be measured by the number of articles published in the magazine in the issues March 1997 through February 1998, as is written at the top of the review form. During that year I edited 13 articles (Mahan, Ferguson, Crabtree, Crowley, North, Parsegian/Austin, Harris, Soulen, Libicki, Perl, Ross, Riordan, Mourou), one of which (the Parsegian and Austin combination article) should count as more than one because making it happen involved a lot of extra work. (More about that article below.) Although this is less than the agreed upon goal, it should be deemed acceptable because of the shortage of articles (AIP should not hold employees responsible for doing work that is not available to do) and because of the extra work caused by that shortage and by management's lack of support for working ahead. Please correct the accounting in this part of the review.

The review gives an incorrect reason (a personal reason) for the mid-year change in my job description. reduction in my article editing goal from 16 to 14, and the corresponding increase in my work following up with authors on articles that have been solicited, was prompted by the magazine's shortage of articles. On 18 August 1997 I gave Benka a note (attached) asking for more articles to edit. On 19 August 1997 he answered with a very defensive note (attached) blaming me in part for the magazine's shortage of articles and at the same time denying that there was any such shortage. He claimed that I was in part to blame, because following up on solicited articles was part of my On the same day (19 August 1997) Benka secretly altered my job description, adding truth to his claim that solicitation follow-up was a significant part of my job. When I discovered the change, he and I discussed it and I agreed to make solicitation follow-up a bigger part of my I asked him to write me a note saying that my job description had been changed (see 25 August 1997 note from Benka, attached).

The change in my job description, while made official in the middle of the year, should be considered retroactive to the beginning of the year, because the problem it addressed was long-standing and I had long before addressed it on my own: The shortage of articles to edit had already

led me to shift some of my work from editing to solicitation follow-up. Solicitation follow-up is an area in which I make valuable contributions to the magazine. This often time-consuming work includes giving feedback to authors and working closely with them to develop greatly improved articles for the magazine.

Finally, on 2 September 1997 I gave Benka a note (attached) explaining that solicitation follow-up was not the weak link in the magazine's feature article operation. That note, the contents of which Benka never disputed, is an important part of this appeal about my performance review, and as such, I ask you to read it. Please remove from my performance review the incorrect reason given for the change in my job description, and add a statement concerning the magazine's shortage of articles, because it played a crucial role in my work last year.

My work on the Parsegian/Austin combination article is one of many examples of how my performance review leaves out major contributions that I have made to the magazine (while carefully including minor, largely contrived, deficiencies). Physics Today was planning to publish in its July 1997 issue a manuscript by V. Adrian Parsegian of the National Institutes of Health, but the article received a highly negative appraisal from the magazine's external reviewer, Robert H. Austin of Princeton University. This caused a crisis, because the magazine had no article to substitute --having completely run out of articles -- and because there was no time for Parsegian to make the extensive revisions that were called for by the reviewer.

Based on the nature of Parsegian's article, the nature of Austin's review and my confidence in the critical abilities of the magazine's readers, I suggested a solution: Publish the article and the review. This was unprecedented at Physics Today, but the editor followed my advice, in part because no other solution was apparent. I edited the combination article and review and handled the delicate and protracted negotiations between Parsegian and Austin, who The solution was innovative, the did not trust each other. result was outstanding and the magazine survived a crisis without damage. In fact, the result was better than it would have been had there been no crisis, because the crisis allowed the magazine to break with tradition. Yet the managers, who seem this year to have developed photographic memories for negative things (real or contrived), have completely forgotten about my special contribution to the magazine during the Parsegian crisis. I ask that my work on the Parsegian/Austin article be described on my annual review, as an example of my valuable advice and aboveaverage work. And I ask that my numerical rating be raised to reflect the new, unbiased text.

You might think it strange that even though the review states that I edited enough articles during the year, it

lists the names of some articles that I didn't edit -articles that were never assigned to me and that I was not expected to edit. That list appears on my performance review as a defensive measure by the editor -- to bolster his claim that under his editorship the magazine does not experience shortages of articles. Soliciting a sufficient number of articles for the magazine is the editor's job, and so the appropriate home for arguments that he has succeeded is the "Employee's Comments" section of his own performance Please remove the sentence and its negative connotation from my performance review. (For a discussion of how the list is not even what it claims to be, see the fourth paragraph of my memo of 2 September 1997.) lists do not appear on the performance reviews of other employees. The performance reviews of Physics Today news writers, for example, do not contain lists of the countless news stories that they could have written but didn't.

The review lists three articles that I edited (Perl, Crabtree/Nelson, Mourou) and claims that the quality of my work varied. In fact, because of my own standards I do a quality job on everything I do. There is, of course, no objective measure of the quality of editorial work. Articles are inherently different and hold a different appeal to different readers. In my performance review the editor implies that praise from authors is one measure, but he fails to note that we received praise from the authors of all three articles. Martin Perl, winner of the 1995 Nobel Prize in Physics, wrote to me and said "Thank you for changing my ugly duckling of a manuscript into a beautiful swan. You have done a wonderful job." I have attached a copy of his note along with a note from George Crabtree of Argonne National Laboratory praising our efficiency, competence and high production standards; Mourou delivered his praise in a telephone call.

It is true that the changes that Benka mentions making in the Mourou article were improvements that other staff members or the author might not have made at one of the later stages in the processing of the article. However, it is wrong to use this as the sole factor in judging the quality of work on the entire article, which would have been excellent even without Benka's improvements. And it is even more wrong to use it to judge an employee's entire year of work. Stephen Benka knows this. He knows, for example, that AIP management will not judge all of his excellent work on the Mourou article solely by the fact that he tried to introduce a mistake in the article's opening paragraph -where he crossed out "30 angstroms" and wrote in "300 nm" and had to be corrected by the Article Editor. And he knows that his supervisors certainly will not judge his entire year of work in part by this mistake. He would see mentioning it on his annual performance review as petty, mean-spirited and sure to make team work impossible because it would give the impression that no error is too small for

the people that he works with to silently note and use against him months later. Please remove from my performance review the entire subjective sentence about the three articles.

Solicitation follow-up

Concerning my solicitation follow-up work, the performance review understates the quality of my work and rates me only slightly above average. The only activity mentioned is that I "regularly nudged authors and reviewers whose items were pending." This is actually the smallest part of solicitation follow-up work. The biggest part, at least for the articles that I work on, is giving detailed feedback to the author and working with the author to develop a much better article. I often go way beyond the call of duty, taking extra time to work closely with authors to improve the final result. I am prepared to supply written evidence showing that my work in this area is exemplary. Please change the review so that it more accurately portrays my work in this area, and raise the numerical rating from the present stingy "3.5."

Advice

Concerning the advice that I offer on editorial and other matters, my supervisors have suddenly (that is, within this review period) started looking for ways to prove that the advice I offer is bad. Coming up empty-handed, they have contrived two examples, one of which is a new, negative interpretation of advice I gave in an earlier review period. My 1998 performance review says, "Jeff's reviews of manuscripts have been completed more promptly than in the past, although they were somewhat less helpful." It is simply not true that my advice was less helpful this year. My comments on manuscripts often went beyond the minimum requirements and spelled out in detail what should be done to produce a publishable article.

As evidence that my advice is less helpful, the performance review gives only the following example, which is presumably my most deficient piece of work in this area for the entire year: "In his review of one Letter to the Editor, for example, he showed questionable judgement in his assessment of the physics competence of the authors of the Hubble Deep Field article (April '97)." There is absolutely no truth to this charge; its only value is that it reveals the bias of those who made it. I demand that my work on this letter be evaluated by an unbiased individual. Stith, I would like you to be that individual, not because it is your job to handle appeals from Physics Today, but because your long-standing interest and expertise in physics education qualifies you to evaluate my work on this letter. All work on the letter was done in writing, and so you have a 100% complete record to review (attached). I challenge

you to find anything in my work on the letter for which I should be punished.

Here is a five-step summary of the facts of the case:

- 1. I edited an article by Henry Ferguson and two coauthors for the April 1997 issue of Physics Today.
- 2. Robert Weinstock, an emeritus professor of physics at Oberlin College, submitted a letter to the editor saying that he didn't understand how astronomers could look back more than half the age of the universe, as a photo caption in the article said. "This claim seems strange to me," wrote Weinstock, "for radiation emitted so long ago must have had its source so close to Earth at the moment of emission -- according to the generally assumed big-bang origin of the currently expanding universe -- that it would have reached Earth [long ago]." He ended his letter by saying that "If there is something wrong with my analysis, I shall be grateful to have it explained to me."
- 3. I thought Weinstock asked an intriguing question and that many of our readers would also be grateful for an explanation (and would value a magazine that gave them such explanations). Here, in its entirety, is my review of the letter: "I think a lot of our readers would appreciate an answer to the question that Weinstock raises. I suggest that we publish a shortened letter (see enclosed edited version) along with an answer from Ferguson." (The parenthetical words were part of my review.)
- To my disappointment, the response from Ferguson and his coauthors was based completely on equations, with no explanation of what was going on. I wanted a physical explanation, not a mathematical one. So I recommended that we ask Ferguson & Co. for something very simple. Of course, as good science writers and teachers know, an explanation that is simple and without equations is sometimes much more difficult to produce. Sometimes when scientists don't have a Feynman-style intuitive understanding of a particular issue, they take refuge in equations. That is, sometimes authors don't understand the physics of every item that they report in their articles. I have encountered this countless times over the years while questioning authors so that I could clarify something in their articles. Sometimes they say: I don't know, my coauthor wrote that part of the article. Or they say: I don't know, I got that from So and So's paper in such and such journal. So in my review of Ferguson's letter I warned that this was one possible reason why we got only equations. I figured that if we were aware of this possibility, then we wouldn't go back to the authors again and again in a futile effort to get something that they were not prepared to supply. Here, in its entirety, is my review of Ferguson's letter: "Weinstock's question should get a physical explanation as an answer, not a

mathematical one like this. I say drop the mathematical one, don't just add the physical one to it. Perhaps ask Ferguson & Co. to write what they would say to a high-school student (or radio audience) who noticed this seeming contradiction. One possible reason that Fergie & Co. answered as they did is that they don't really understand the physics."

5. Benka rejected my suggestion that we ask Ferguson for a simple answer, and, ironically, punished me seven months later for not being fully confident that Ferguson could have provided such an answer. Because my advice was rejected, Physics Today readers ended up seeing no question from Weinstock and no answer from Ferguson.

You can see clearly now that while my performance review says, "he showed questionable judgement in his assessment of the physics competence of the authors, " I in fact never made any assessment of the physics competence of the authors, positive or negative. Even if I had made such an assessment, the Physics Today managers did not and cannot accurately claim that the advice it led me to give was anything less than excellent. Their relentless search to find fault with my work, and their twisted and biased evaluations of my work when it contains no real fault, raise serious questions about their professionalism as managers and certainly disqualify them from judging my performance. If you judge that I did good work on the letter, as I claim, then I ask that my performance review mention that work as an example of my routine interest in serving the magazine's readers, and that the numerical rating on my review be raised to reflect the new, unbiased assessment. I ask AIP to make these adjustments not just to make my performance review more accurate, but more importantly as an urgently needed announcement that AIP will no longer use performance reviews to punish employees who raise troubling workplace issues.

As with every other part of my performance review, Benka refused to make any changes in this part of the review when I pointed out its inaccuracy. I asked him if he had any other examples of my supposedly bad judgment. could think of was something from an earlier review period: my suggestion that Physics Today try to get G. Pascal Zachary to write an article about Vannevar Bush. Zachary is a journalist -- one of the best in the country, I think -as well as a history of science scholar. I had learned that he was writing the first ever biography of Bush, who was the first presidential science advisor and an individual who played a key role in shaping the federal science policy that prevailed for decades after World War II. After I proposed this article at a staff meeting, Physics Today publisher Charles Harris spoke about it with AIP history division postdoc Joel Genuth, a friend of Harris's at the time. spoke with Genuth, too. Genuth advised against the article,

because Zachary was not a mainstream thinker -- quickly adding that he (Genuth) was "no slouch" and could write the article for Physics Today. At a subsequent staff meeting, I reported positive evaluations of my proposal from more established science historians and argued that our readers could handle Zachary's point of view. But Harris stuck with Genuth's review, and so that was the end of my proposal.

Now, more than a year later, during the discussion of my 1998 annual review, Benka has put a new, totally negative spin on my work on the Zachary proposal. To my surprise, when he mentioned my judgment in the Zachary case, Benka showed no sign of embarrassment, apparently completely unaware that Zachary's book was recently published to widespread praise and attention. The vast majority of books are not reviewed anywhere, but Zachary's Endless Frontier: Vannevar Bush, Engineer of the American Century (The Free Press, 1997) was both widely and positively reviewed by well-respected experts writing in major publications. (Please read the attached reviews.) Apparently, the official Physics Today line now is that Zachary managed to hoodwink major American publications and experts -- but not Physics Today. Again, because my advice was not followed, Physics Today readers missed out on what surely would have been an interesting article. Yet I am the one whose judgment is being questioned -- for reasons that I will explain below.

I ask that my performance review be corrected so that my judgment, and its value to the magazine, is discussed positively rather than negatively. I would like my work on the Zachary proposal to be mentioned as an example of the fact that I offer ideas of merit even though I am not expected to be a major source of article or story ideas. I ask that the numerical rating be raised to reflect the new positive evaluation, and that the rating be above average to reflect the fact that I offer more than the required advice. I request that AIP make this change not just to make my performance review more honest, but more importantly as an implied announcement that AIP will no longer prejudice performance reviews against employees who raise awkward workplace issues.

Additional comments

In the handbook that is given to all employees, the American Institute of Physics promises that the annual performance review will feature a discussion of "mutual goals." (Employee Handbook, page 18.) Without explanation, this year Benka followed neither the letter nor the spirit of this policy, and didn't even pretend to be interested in what direction I might want to go in my work at AIP. The discussion was unlike anything I have experienced in previous years. He simply announced a big change in my job description -- an increase in my workload by as much as

three months' worth of work per year -- and discussed it as if he were giving orders to a machine. Over the years my job description has changed many times (the most recent change being on 25 August 1997), but never by unilateral management dictate, without discussion and mutual agreement. For reasons that I will explain below, I think this change, and its unilateral imposition in violation of American Institute of Physics policy and usual practice, is punitive.

The written review accurately calls the change "new demands." But it inaccurately implies that other Physics Today staff members are meeting such new demands. My coworkers have experienced no such major increases in their workloads either voluntarily or by management order (except in one or two cases in which individuals have voluntarily renegotiated their job descriptions, job titles and salaries). My coworkers and I work hard and cannot reasonably be expected to take on additional work. Among my coworkers who have not stepped up their workloads are Gloria Lubkin, Barbara Levi, Bert Schwarzschild, Charles Day, Irwin Goodwin, Carol Lucas, Toni Feder, Jean Kumagai and Warren Kornberg.

The 25 August 1997 agreed-upon change in my job description reduced my article editing work to 70% of my time (14 articles per year) so that I could increase my work in other areas, which I have done. Now, just a few months later, AIP is using my performance review to arbitrarily increase my annual article editing load to 18 -- a 28 percent jump. The performance review also changes my job description to add a significant load of clerical work (keyboarding) to my job for the first time in my 17 years at the magazine. Other editors who work better on paper (for example, the book review editor and the copy editor) are not being told to change the way they work or to take on the associated clerical work. This clerical work, which includes keyboarding the dozens of changes made by the copy editor, could take as much as a few days per month, depending upon the article. It would lower the overall efficiency of work at the magazine, because the time spent on clerical work would, of course, reduce the time available to do other work such as article editing and article solicitation; instead of paying \$15/hour for clerical work, AIP would pay \$30/hour. Like many people, I do better work on paper than on a computer screen (and a long-standing back problem precludes long sessions sitting in front of the screen anyway). I ask that support staff be made available once again. Even if management had a valid reason for adding clerical work to my job, that reason cannot be a new one. What \underline{is} new is that, for reasons discussed below, management has suddenly gotten "on my case" and is taking a hard-line on every issue.

In Benka's <u>pro forma</u> discussion with me about my performance review, he never asked about the direction in

which I would like to go on the job. If I were able to take on additional work, I would like that additional work to be somewhat different from what I am doing now, to provide some variety and to contribute to the magazine in a different way. When I explained this to Benka, he acted uninterested and reasserted his uninspiring, unilaterally developed plan for me, which is to do the same work, only a lot more of it.

Reprisal and repression

The American Institute of Physics is making a strong effort to prevent Physics Today staff members from pursuing workplace grievances in an organized way. Problems are to be discussed with managers on an individual basis only, we have been told. (Message transmitted to staff through warnings to Graham Collins and in other ways.)

Physics Today staff members have many legitimate concerns. Many believe, for example, that the company fails to provide conditions of employment appropriate for professionals. According to my philosophy, if there is a problem, then everyone who is in a position to address it has a moral obligation to do so. Thus, problems at the magazine are everyone's business -- the business at least of everyone who works there. Even though management doesn't see it that way, I have always tried to do whatever I could to help solve problems that arise, whether or not they affect me directly. You, too, are in a position to do something about the problems at the magazine, and therefore I think you have an obligation to do so, for the sake of both the magazine's staff and the physics community.

During the discussion of my performance review, Physics Today editor Stephen Benka condemned my organizing activities at the magazine and said bluntly that such activity "is not going to be tolerated anymore." He characterized the staff actions in which I have played a leading role as nothing more than "disruptive," rejecting my view that the source of the problem is management's failure to address staff grievances. A workplace in which unity is discouraged, as it is now at the magazine, is disruptive. The low morale, the inability to confront problems, the loss of talented and dedicated staff due to a love-it-or-leave-it atmosphere -- these consequences of management policy are disruptive and wasteful.

Physics Today publisher Charles Harris has made it clear to me and to many staff members (names withheld) that our activities have infuriated him. And American Institute of Physics Executive Director/CEO Marc Brodsky has characterized some of my activities, presumably reported to him by Harris, as "counterproductive" (20 March 1998). It is clear that Benka's hard-line attitude toward me is an attempt to redress Harris's and Brodsky's grievances with

the staff -- in particular, with those staff members whom Harris has identified as ringleaders. (Harris's ringleader theory insults the staff, because it implies that staff grievances arise not because of real problems in the workplace, but because an evil few have corrupted the minds of happy but gullible staff members and led them astray like children.)

In this memo I will be open about my organizing activities at Physics Today, because the problems at the magazine call for an organized response and because the physics community strongly supports physicists' right to organize without fear of reprisal. The latter point is evidenced, for example, in the community's many years of support for Soviet physicists who were punished for organizing, and in its concern today for physicists in other countries who face similar repression. In any case, freedom to address workplace problems is a necessary component of a truly democratic society.

Management is attempting in two ways to prevent the Physics Today staff from pursuing collective grievances -- by punishing those who speak out the most and by maintaining an increasingly repressive workplace atmosphere. My lower performance rating and subjection to an arbitrarily revised job description that makes "new demands" are punishments for taking up staff grievances. What follows is a discussion of a few of the collective staff activities in which I played a leading role and for which management criticizes me. Included is a discussion of some of the repressive measures that management has taken in response to those activities. The discussion should make it clear that my review is only one part of a series of recent attempts to stop me from promoting or engaging in any concerted staff activity.

1996 retreat

During the discussion of my performance review, Benka criticized me for my activities around the 19-20 November 1996 Physics Today retreat. Before that two-day meeting, I and some coworkers (names withheld) developed and distributed to the entire staff a list of changes that we wanted made at the workplace. We presented these requests in the form of a proposed agenda for the retreat. Fearing reprisals for making requests that might not please management, we did not disclose our names. However, the fact that I played a leading role was known to all. security was our highest priority, and so our demand for that topped our list. (See item 1 in attached document of 15 November 1996.) Other requests included staff involvement in workplace dispute resolution (item 4), better distribution of job tasks (item 5), affirmative action in hiring (item 8), and conditions of employment appropriate for professionals (the other items).

Salary equity

I worked with other staff members to demand pay equity at Physics Today. On behalf of those of us who were pushing for this, I told the Physics Today advisory committee at their 4 October 1996 meeting that the large salary differentials among the staff were not only unfair, but also divisive and bad for morale and productivity. I raised the issue at various staff meetings as well. Management was not pleased by the pressure we applied, in part because it forced them to give a staff member (name withheld) a special 25% salary increase, beginning on 1 June 1997.

Affirmative action

Management's anger at me increased dramatically, and never subsided, when I worked with Jean Kumagai and other staff members (names withheld) to assert the need for equal opportunity and affirmative action in hiring at Physics We raised the issue when Ray Ladbury left the magazine, creating an opening on the editorial staff. replacement, Charles Day, started work on 2 June 1997.) spoke out strongly on the equal opportunity and affirmative action issue, because Jean and I and the others didn't think Physics Today or AIP management took it seriously. concerns were largely ignored, and so, later in the year, we decided to bring the problem to the attention of the Physics Today advisory committee at its annual meeting, held 17 October 1997. On behalf of the concerned staff members (names withheld), I brought the matter to the committee's attention.

One week later, on 24 October 1997, American Institute of Physics Executive Director/CEO Marc Brodsky called me and said that I had made "a very, very serious charge." (Detailed notes available.) He directed me to meet with him and defend my charge, and I did so on 5 November 1997. At that meeting I gave Brodsky a note summarizing the important points. Rather than repeat those points here, I am attaching a copy of the note. (See note of 5 November 1997.) That note is an important part of this appeal about my performance review, and so I ask that you read it.

At my meeting with Brodsky I also pointed out that AIP had failed to conduct the affirmative action training that it promised to conduct in its 284-page "1996 Affirmative Action Program for American Institute of Physics." (See attached excerpts.) Among the many promises that AIP makes in that 1996 document is that "During the current plan year we will be conducting training for all employees about our affirmative action program and equal employment opportunity in the workplace." I pointed out to Brodsky that AIP did not conduct the promised training. He countered by saying that he was pretty sure that he mentioned affirmative action either at the one-hour question-and-answer session that he

held on 20 June 1996 or at the Q&A meeting that he conducted for employees at AIP's facility in Woodbury, New York. (I recall no such mention at the 20 June 1996 College Park meeting.) He indicated that this mention was the promised affirmative action "training."

Brodsky said he would look into affirmative action at Physics Today and tell me what he found. After a 4.5-month investigation, he met with me on 20 March 1998 and reported that he found that Physics Today's affirmative action program was doing very well. He said he judges the program by its results. (This was mysterious, because as of 20 March 1998, the Physics Today staff in the College Park office was all white; out of a staff of 18, the magazine had only one minority employee, working from New York.) I asked again about the promised affirmative action training. time he said he was sure that he had mentioned affirmative action at both 1996 Q&A meetings, and he again indicated that such mention was the promised affirmative action training. After extensive questioning, he said that such mention was "part of" the promised training. I asked him when the rest of the training would be done, and he promised to look into that. In the end, I told Brodsky that we still believe our concerns to be well founded and that we are disappointed with his response. Apparently in Brodsky's view, however, the upshot of what happened is that I leveled serious, totally unfounded charges at AIP, and he is not happy about that.

1997 retreat

Management's anger at me increased yet again (and has not decreased since) when I helped raise staff concerns before and during the 25 September 1997 one-day Physics Today retreat. Before that meeting, I played a leading role in producing a list of proposed agenda items that represented a few of the many staff concerns. A majority of the staff supported it, and half of the staff signed it. (See attached e-mail message of 18 September 1997.) The top item on that list was a request for greater staff participation in decision making. The days leading up to the meeting saw much debate between management and many staff members over the meeting agenda, which management was formulating. Harris became upset that the staff wasn't embracing his agenda, and he began treating me and my coworker Graham Collins as ringleaders on the staff side, apparently becoming permanently angry at us.

At the retreat itself I asked if staff members could ask questions. Harris said no. I then said that I thought that we <u>should</u> be allowed to ask questions. Harris angrily said "No, That's an order!" Some days after the meeting he explained that he thought my request for the right to ask questions was another attempt to promote the staff agenda. At the retreat and in subsequent weeks, a number of brave

coworkers openly criticized Harris for the way in which he shut me up.

Gag order

After the retreat Harris put a gag order on me, handing me a written "notice" that implied that I would be fired the next time I said anything that Harris considered to be "counterproductive." (Document dated 26 September 1997 withheld.) This outraged many of my coworkers, who saw my forced silence as against their interest. They openly criticized the gag order, forcing Harris to rescind it. (Electronic mail message of 2 December 1997 withheld.) He did so reluctantly and without any decrease in his anger toward me.

Appeal to advisory committee

The gag order was just one of many management actions that strongly discouraged staff members from raising grievances of any sort. In an effort to get this chill lifted, a number of staff members (names withheld) decided to appeal to the Physics Today advisory committee at its annual meeting on 17 October 1997. We made our appeal to the committee, which reports to AIP's top management, in writing (memo of 17 October 1997 withheld) and in individual oral presentations. Our written note was titled, "Freer Atmosphere Needed at Physics Today" and began, "At Physics Today there is an increasingly repressive atmosphere that discourages staff initiatives.... The memo described how Physics Today staff member Graham Collins had also been warned about speaking up about workplace problems. contained the following paragraph: "Both Jeff and Graham have been outspoken about problems that many of us see at the magazine. We feel that the lecture to Graham and the written notice to Jeff both contribute to a repressive atmosphere at the magazine and restrict all of us. We hope the advisory committee will do whatever it can to get these warnings retracted, and to remind the PT managers that repression is counterproductive. Such steps would go a long way toward diminishing the fear that staff members now associate with trying to openly address problems at the magazine."

Harris has harshly criticized me for my leading role in the presentations to the advisory committee, telling me and others (names withheld) incorrectly that I tried to get him fired. He sees this as an unforgivable offense that obligates him as a matter of manly honor to fire me or eventually drive me out and that gives him the moral right to do so by any means. Those means include steps that appear honest to outsiders but are not -- such as the present performance review, which imposes an unattainable goal that can be used against me a year from now when it has

not been met. When I explained to Harris that neither I nor the other staff members involved tried to get him fired or even wanted that to happen, he replied that I was either naive or lying. (I still do not want him fired, but I can no longer speak for others on this point. Respect and support for Harris by other staff members, including some not involved in our collective activities, have deteriorated sharply.)

Ban on my private conversations

In pursuit of his agenda, Harris has evidently given Benka license to go after me and other perceived management enemies on the staff. I will briefly describe here a recent example. (A more detailed account is available.) At about 6 pm on Wednesday 28 January 1998, I was in my office talking to my coworker Toni Feder on the telephone when Benka opened the door and asked rudely and sarcastically if I was talking to one of our authors. I said, "No, I'm talking to a coworker, Toni." He acted as if he already knew that. He stepped further into my office and said that he wanted in on our conversation. This was unprecedented and frightful. I switched Toni to the speakerphone and told her that Stephen Benka was here and wanted to be in on our conversation. She sounded equally shocked. Benka suggested that she walk over from her office to mine, and she said OK. I then walked out of my office and into the open area of desks just outside, and Benka followed. I did this to make room for Toni and to get some physical distance between myself and my supervisor, who was clearly behaving very strangely.

After Toni arrived, Benka asked us what we had been talking about on the telephone. I thought his question was way out of line, but I answered it anyway: We had been discussing the May 1998 50th anniversary issue of Physics Today. But after giving that short answer, I said that the important question is why he was trying to barge in on our conversation.

He answered by announcing that Physics Today management is forbidding all private conversations between staff members at work. From now on, all conversations between staff members must be open to management supervision, he said. When I asked him why, he referred to the organizing activity that took place last year and said that he doesn't want that to happen again. This smelled like a retaliatory and repressive policy aimed primarily at me, and so I asked him whether or not it applies to everyone. He said it does. I didn't believe him (but I didn't say that I didn't believe him), and so I pressed him three or four times to say whether or not he was going to announce the new policy to the rest of the staff. His final statement was that he knows that I want to know that.

The policy was never formally imposed on the rest of the staff, of course. But news of management's anger at private conversations spread quickly throughout the staff (yes, by way of private conversations). Even though the totalitarian policy officially applies only to me and Toni, it has put a chill on everyone's expression and has contributed to the repressive atmosphere at Physics Today.

Physics Today loses Graham Collins

In this memo I have for obvious reasons focused on my own case. But I don't want to leave the impression that management is critical only of me. In fact, they target any employee who speaks out about workplace problems. My most outspoken coworker, Graham Collins, was also the subject of a gag order and other reprimands for saying what many on the staff were thinking but were afraid to say. (Graham's gag order and mine were lifted at the same time.) I won't explain here how management irresponsibly made leaving the magazine Graham's best option. The details are available elsewhere. But with permission from Graham and all involved, I am attaching a copy of a note to Graham that I helped write after he submitted his resignation. attached note of 16 March 1998; authors' names withheld.) Please read the note as an integral part of my performance review appeal, as it contains a number of important and relevant points not made elsewhere.

'On my case'

As I mentioned above, management is now "on my case," and so my work is now subjected to greater scrutiny. Without precedent, the magazine's management recently examined and criticized some of my work before I completed it. (That was my work on the first of the five decade sections for the May 1998 50th anniversary issue of Physics Today.) Ever since the 1997 retreat, Physics Today publisher Charles Harris has given me the impression that I am being monitored. After the retreat he attended almost every magazine department meeting that I attended -- meetings that he had only rarely attended in the past. After some meetings, he commented privately to others about my performance.

Your moral responsibility

Physics Today's new love-it-or-leave-it policy, mentioned in the 16 March 1998 note to Graham, implies that the magazine's problems originate in the staff. Keeping the focus on the staff is not simply a harmless way that management diverts attention from itself, but is extremely costly. In the short time since Graham submitted his resignation, editor Benka's assistant Susan Funk has quit in frustration, and publisher Harris's assistant Carol Lucas has resigned. The loss of experienced staff, the

discouraged state of many of those who remain, the repressive atmosphere's toll on creativity -- in general, the frustration of those who want their job to be more than a simple exchange of time for money -- in these and other ways current policy wastes the resources of the physics community. You have a responsibility to undo the current widespread cynicism at Physics Today by making staffinitiated change possible.

18 August 1997

Steve --

As I have noted in many conversations and memos over the years, I work most efficiently in my job of feature article editing when I have articles at all stages of development. That means, for example, some articles that have just been solicited, some that have been submitted and reviewed, and some that have been revised by the author and are ready to edit.

As you know, our supply of articles in the last category has followed a "feast or famine" pattern -- mostly famine. This has held down my productivity to the point where I cannot afford to take the full 30-day vacation that I recently requested (and that you approved) and still meet my annual article editing goal. So I am thinking about cutting that vacation in half, perhaps, and using the rest of my vacation time at some later date. I won't be able to work out the details until some articles in the last category trickle in and I can draw up a schedule.

As of today, we have received neither of the two manuscripts that I am going to edit for the December issue. I would be working on them now if we had them. The Riordan manuscript, for example, is not expected to arrive until around the time I had planned to go on vacation. And I have no articles that I can edit now for issues following December. I would like to edit two articles for the January issue and two for the February issue, but I will not be able to do that under our usual famine conditions -- I will need to have the manuscripts much earlier than I have been getting them. If today I had four manuscripts ready to edit for those two issues, I could work on all four simultaneously, using my time to greatest advantage. I think you will agree that the magazine should be in a position where such productivity and advance work is routine.

Given the status of the December manuscripts, a 30-day vacation as planned would compromise my ability to edit two articles for that issue. I would like to take a shorter vacation and continue working at home much of the time, as long as that continues to work well. Please let me know if that is OK, and in any case please see how soon I can have four articles that are ready to edit for the January and February issues.

Jeff.

August 19, 1997

Jeff,

It is the responsibility of the article editors at Physics Today to produce finished articles starting from any point in a given article's development.

Thus the responsibility of generating "ready to edit" articles is in part yours. For one example, we had agreed that you would obtain Colson's article on free-electron lasers, and have it edited in case we needed it for an emergency fifth article in the October special issue on the electron; otherwise we could drop it into the magazine a month or two later. Fortunately, we don't need it for the special issue; to my knowledge you have yet to acquire the article.

You were my first choice to edit several articles in late stages of development in the recent past, but turned them all down: Fink (March); Cohn (May; I edited that one, while you edited none that month); Jeanloz to edit with Soulen (August); a second article for October (you were reluctant to take Perl); Kasap for November.

As recently as two months ago, when you wanted to take paternity leave (which I OK'ed), you told me you didn't want any additional articles through the end of this year. As noted above, I offered you some anyway and you turned them down. You expressed no interest in articles, so I left you out of my plans for them.

I understand your special circumstances and once again offer you my heartfelt congratulations on the birth of Joshua Rose. If you are now ready once again to accept the responsibilities that go with feature articles, I can supply you with as many as you want. The articles that are currently "ready to edit" have been assigned to others. Nevertheless, I am sure we can reach a mutually acceptable state of affairs.

Steve

22

PHYSICS TODAY

from Stephen G. Benka

Jeff, As we discussed, as if today we are shifting your job tasks slightly: Actual editing goes from a weight of 80% to 70%. Following up on solicited articles goes from 15% to 25%. Steve 8/25/97

2 September 1997

Steve --

Thank you for responding to my note of 18 August 1997, in which I ask for more work -- specifically, more feature-article manuscripts that I can edit for publication in the magazine ahead of deadline. I was dismayed to find that instead of welcoming my request, your response focuses on assigning blame for the lack of such manuscripts and goes on to deny that we have any such deficiency.

You base the first part of your response on the fact that Physics Today staff members do follow-up work with the people whom you have invited to write articles for the magazine. You note that these staff members are therefore "in part" responsible for obtaining manuscripts that are ready to edit for publication. All this is true, but our severe shortage of such manuscripts is not due to deficient solicitation follow-up work by the staff as you imply. The article editors on the staff have, in fact, done a good job of following up on solicited articles -- staying in contact with the authors and working with them to produce the articles that you have asked them to write. If you think you could do better than we do, you should share your secret. For whatever it is worth, my experience is that when a conscientious and hardworking staff is blamed for a long-standing problem, the diagnosis is usually incorrect, and an incorrect diagnosis is an impediment to a real solution. (In my own case, according to my job description, solicitation follow-up has been a small part of my job; but I work at it conscientiously, and on my latest annual review you said that I do above-average work in this area.)

No, the problem is not your staff's lack of competence in its follow-up work with authors. The problem is simply that the magazine has solicited far too few articles. This has had unfortunate consequences, not only for the staff (as my note of 18 August 1997 describes for my case), but also for the magazine's subscribers. In the past three years I doubt that we have had even three months in which we have had a backlog of manuscripts ready to edit. Typically, the editor scrapes each issue together in a near-crisis atmosphere, after a desperate search around the office for manuscripts that may have arrived -- or that are said to be "in the mail." The lineup of articles in most issues of Physics Today is thus dictated by forces beyond our control.

Your listing of manuscripts that you say you offered to me begs the question of giving me more manuscripts that I can edit and prepare for publication, because we did not have the manuscripts on your list. In your own words, they were "in late stages of development." I should point out that even manuscripts that you consider ready to edit often are not. And when the shortage of manuscripts forces us to schedule incomplete manuscripts for near-term publication, we often have to pressure authors to work with us under undo

time pressure. This is unfair to both the author and the Physics Today staff, because it deprives them of the opportunity to do their best and therefore most satisfying work. The largest group to suffer, of course, are the readers. I don't know how many of the articles that you listed fell into that category, because I did not work on those articles.

As I said in my memo of 18 August 1997, I think article editing work is done most efficiently when it is done well ahead of the deadline. So in general I seek to work in advance and am reluctant to take on articles that, due to the shortage, will necessarily have to be done at the last minute, often after I have already scheduled work on other articles and often well after any reasonable deadline for submission. Month after month our work should not consist of "rush jobs" for issues that are upon us. I would have taken on the articles in your list if they had been scheduled for later issues -- or, even better, if they had not yet been scheduled for specific issues. But because of our serious lack of manuscripts, it has almost never been possible to work ahead.

In your response you say that I "agreed" to obtain William Colson's article by a particular date. This cannot be true. There is no way that I or any other Physics Today staff member could credibly "agree" that Colson and his coauthors would finish writing their article by a date that you picked arbitrarily. Only Colson and his coauthors -- all volunteers, remember -- could do that, and they did not. We cannot suddenly and unilaterally spring a short deadline on an author. The most we can do is ask our authors if they can meet such a deadline. Over the years you have asked many authors whether or not they could meet particular deadlines that you had in mind, and you have accepted later deadlines when they told you what they could do. Just because you are now talking to a staff member, rather than directly to the author, doesn't mean you can "just say article" and have it appear.

In the final paragraph of your response to my request for manuscripts, you boast: "I can supply you with as many as you want." This is simply not true. In fact, when we spoke after I received your response, you could not supply even one manuscript that I could edit for the January issue, the February issue or any subsequent issue. Of course, we will eventually come up with something to fill the holes in those issues. But, as usual, that is not likely to happen soon enough to allow us to work ahead. I am sure we could continue to pretend that this modus operandi is not a serious problem -- after all, we have managed to get by with it for a number of years. But it takes an unnecessary toll on many people, and so I think we have a moral responsibility to the staff (article editors, editorial assistants, art editor and copy editors), authors and

readers to solve the problem. I think the obvious first step is to admit that we do have a serious shortage of manuscripts and that the shortage leads to the problems that I have described here and in my note of 18 August 1997.

As I mentioned above, solicitation follow-up work has been only a small part of my job -- at least that is what I thought. When I saw how much you emphasized it in your response to my note, I took a look at my job description and noticed that such work was a bigger part of my job than I had remembered. Upon further investigation, however, I discovered that you had altered my job description after the fact to add truth to your claim. Indeed, the altered job description was dated 19 August 1997, the same date carried by your response to my note. For future reference, let me say here that I and other members of the staff prefer an above-board management style, where, for example, important changes are pointed out to people rather than being left for them to discover -- or, perhaps, not discover. In any case, you and I discussed the change in my job description on 25 August 1997, and I agreed to it. Thus, I will increase my solicitation follow-up work by about 2/3 and reduce my article editing by 1 part in 8. (I will continue to spend the large majority of my time on article editing.) of my preference for doing things above-board, I asked you to write me a note describing the change in my job description, and I thank you for doing so.

For the record: In your response to my note, you say that you OK'd my request for paternity leave. My recollection is that you neither approved it nor denied it, because I withdrew my request before you responded.

So that we don't wander too far from the original issue, let me repeat that I made my 18 August 1997 request because I felt that I was being held responsible for a particular amount of work (my annual article-editing goal) while being made to work so inefficiently that I could not do that amount of work -- at least not with sufficient time left over to take some time off. My revised job description will lessen slightly my need for ready-to-edit articles, and so should provide some relief in this area.

The Riordan manuscript has just arrived, and I would like to work on it now, so as to finish it as far ahead of the deadline as possible. Unless you tell me otherwise, that is what I will do. Perhaps I will take some vacation time later, depending in part on what other work comes in.



From: "Martin L. Perl" <martin@SLAC.Stanford.EDU>

To: Jeff Schmidt <jds@aip.org>
Date: 2 Sep 1997 (Tue) 17:13

Subject: Leptons After 100 Years Article

Dear Jeff

Thank you for changing my ugly duckling of a manuscript into a beautiful swan. You have done a wonderful job.

I have the following comments:

Page 35, column 2: the ***** in "See box 1 on page *****" 36 has not been inserted yet.

Page 39, column 2: the ***** in "See box 2 on page ***** 40 has not been inserted yet.

Page 36, bottom equation in column 2: space required between virtual and 70.

Page 38, Figure 4: TAU DETECTION scheme might be changed to TAU DETECTION apparatus.

Page 40, Box 2, column i: yes, each h should be an h-bar.

Page 40, References: the names in Ref. 3 are spelled correctly; in Ref. 10 the page number is 2074; in Ref 16 the page number is indeed 79c, it is a conference proceedings and every page has a c added to the page number.

Thank you so much Jeff for all your helpa dn guidance. I am greatly looking forward to the issue.

Sincerely yours

Martin Perl

From:

"George Crabtree" <george_crabtree@qmgate.anl.gov>

To: Date: "Judy Barker" <jbarker@aip.acp.org>

15 Apr 1997 (Tue) 19:24

Subject:

Vortex Article

Subject: Vortex Article Time: 5:26 PM Date: 4/15/97

Dear Steve, Jeff, Barbara, and Judy,

I just received the offprints for our article on Vortex Physics in the April issue of Physics Today. What fast service! The article looked very good in the magazine, and I got a warm feeling on finally seeing it in print. Thanks to all of you for your efficient and competant efforts to bring the article out. For David and me, it is gratifying to see the fruits of our work appear with such high production standards. Thank you all once again. Sincerely, George Crabtree

George Crabtree - MSD/223 Argonne National Laboratory 9700 S. Cass Avenue Argonne, IL 60439

phone: 630-252-5509

fax: 630-252-7777 e-mail: crabtree@anl.gov

CC:

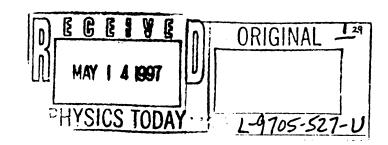
"David Nelson" <nelson@cmt.harvard.edu>

Letter to the Editor Review Form

	Review Form
	L-9705-527-U Weinstock, Robert
Title:	Comments on "Probing the Faintest Galaxies, April 1997
Review by: js	Date Assigned: 5/22/97 Date Completed:
to the	Reject Staff Revise Author Revise Place and answer from Ferguson, Version along with an answer from Ferguson,
	-JS

Please return to Susan Funk by 5 June 1997. Many Thanks!

Review by :	_ Date Assigned:	Date Completed:		
Accept	Reject	Staff Revise		Author Revise
oK	Get	Fergus	mó	response
	-5	Teve 6/30/9	7	



Letter to Physics Today:

In "Probing the Faintest Galaxies", by Ferguson, Williams, and Cowie (April 1997), the caption to Figure 1 reads, in part, "For most of the galaxies in the image, we are looking back more than half the age of the universe".

This claim seem strange to me; for radiation emitted so long ago must have had its source so close to Earth at the moment of emission — according to the generally assumed big-bang origin of the currently expanding universe—that it would have reached Earth, if at all, well before the era of telescopes, spectrometers, and, of course, us. That this is so springs from the fact that no source can recede from the earth at a speed greater than that of the radiation—namely, c.

To derive this conclusion, let us measure all times and distances relative to Earth's rest frame and let

t = measure of time, from big bang at t = 0

T = age of universe (= time elapsed from big bang to Earth's receipt of radiation from source)

 θ = time after big bang at which radiation is emitted from source

 $\overline{v}=$ average speed of separation of source and Earth from big bang (t=0) to emission of radiation (t=0).

Thus the total separation of source and Earth at time of emission – i.e., the distance the radiation travels at speed c from source to Earth — must be $\bar{v}\,\theta$, and the time elapsed during the radiation's journey is

$$T-\theta=\frac{\overline{v}\,\theta}{c}\,,$$

(5)

from which follows

$$\theta = \frac{T}{1 + (\overline{v}/c)}$$

And from $0 < (\overline{v}/c) < 1$, \neq i.e., the limiting feature of the speed of light

✓ we conclude

 $0.5T < \theta < T$.

Not

Any radiation we receive today must have been emitted therefore at least half the age of the universe after the big bang.

How, then, if the above analysis is sound, do Ferguson, Williams, and Cowie — along with others — suppose radiation to have reached Earth in the 20th century from a source that was, at moment of emission, farther from Earth than (cT/2)? Since they evidently infer emitter distance from the doppler-shift magnitude, a ready to-mind answer is their use of an erroneous relation between emitter distance and doppler-shift

measurement

If however there is something wrong with my analysis above, I shall be grateful to have it explained to me.

Robert Weinstock

Robert Weinstock

Emeritus Professor of Physics

Oberlin College

Oberlin, OH 44074

ZWEINSTOCK@OBERLIN.EDU

(216) 775-8337

Jeff: Spured by your review, we are planning to publish weinstacks letter [0]; Fergus on [2] suggests we read his response [3] and consider publishing

From:

Harry Ferguson <ferguson@stsci.edu>

To: Date:

ACP.AIP(pelliot) 7/28/97 10:37am

Subject:

Reply to Weinstock letter

Dear Paul,

tor

his

lack

of

he

Here is our reply to the letter to the editor. Actually, we wouldn't recommend publishing either the letter or our reply, as this sort of basic question about light travel times seems a bit out of place for your letters section. Perhaps you should forward our reply to Dr. Weinstock directly and see if that satisfies him?

> Sincerely, Harry Ferguson

SB: Weinstock letter below, followed by Ferguson reply.
Ferguson recommends we not publish either. So does Chas.
Jeff says offernise - see rext page. I suggest we

think you?

Weinstock Letter to the Editor

ask In *Probing the Faintest Galaxies, * by Henry Ferguson, Robert weinstick Williams and Lennox Cowie (PHYSICS TODAY, April, page 24), the figure 1 caption reads, in part, *For most of the galaxies in the image, we are looking back more than half the age of the answer universe.* sufficer

This claim seems strange to me. Radiation emitted so long ago must have had its source so close to Earth at the moment of himi emission*according to the generally assumed Big Bang origin of the currently expanding universe*that it would have reached Earth, if at all, well before the era of telescopes, spectrometers and, of course, us. That this is so springs from may feel oublication the fact that no source can recede from the earth at a speed greater than that of the radiation*namely, c. A simple Lupues calculation, in fact, shows that we are looking back through less' than half the age of the universe. Can it be that Ferguson et al. are using an erroneous relation between emitter distance and doppler-shift measurement?

If there is something wrong with my analysis, I shall be grateful to have it explained to me.

- > @SIGNATURE = ROBERT WEINSTOCK
- > @ADDRESS = (zweinstock@oberlin.edu)
- > @ADDRESS = Oberlin College
- > @ADDRESS = Oberlin, Ohio

lFerguson et al. reply

The redshift distribution of the galaxies in the HDF is not known 8/13/4 precisely, however, a very conservative guess based on Keck spectroscopy of the brighter galaxies and the colors of the fainter galaxies is that more that half the galaxies have redshifts z > 0.8.

The statement made in the caption of figure 1 comes from a

calculation of lookback time to a galaxy at z=0.8. For a critical-density universe with a cosmological constant lambda = 0, the lookback time is

tau = 2/3 H_0^-1 $(1-1/(1+z)^{(3/2)})$ and the present age of the universe is $t_0 = 2/3$ H_0^-1 where H_0 is the Hubble constant.

For this cosmology, a galaxy at z=0.8 has tau = 0.6 * t_0. In other words the lookback time is more than half the present age of the universe.

A general expression for the lookback time with arbitrary values of the cosmological constant and density parameter is given in Carroll et al., 1992, Ann. Rev. Astron. Astrophys., 30, 499 (equation 16).

Henry Ferguson Robert Williams Lennox Cowie

Paul -

Weinstock's question should get a physical explanation as an enswer, not a mathematical one like this.

I say drop the mathematical one, don't just add the physical one to it. Perhaps ask ferguson 4 Co. to write what they would say to a ferguson 4 Co. to write what they would say to a formation student who noticed this seeming contradiction. One possible reason that Fergie 4 Co. auswered as they did is that they don't really understand the physics.

- Jeff 28Jul.97

PHYSICS TODAY

from Stephen G. Benka

Paul,
Forward Ferguson's
response to Weinstock.
We won't publish
either the letter or the
response.

Steve 8/14/97

Scientocracy

Vannevar Bush envisioned a brave new world run by scientists.

ENDLESS FRONTIER

Vannevar Bush, Engineer of the American Century. By G. Pascal Zachary. Illustrated. 518 pp. New York: The Free Press. \$32.50.

By Thomas P. Hughes

URING World War II, Vannevar Bush mobilized America's engineers and scientists, presided over the making of the atomic bombs, advised President Truman on the decision to use them against Japan and, in a memorable essay entitled "Science—The Endless Frontier," formulated a bold policy for the country's postwar cultivation of science and engineering. He defined, as well, the military-industrial-university complex and gave it the impetus that propels it today. As G. Pascal Zachary observes in "Endless Frontier," no wartime figure in the world marshaled such enormous engineering and scientific resources.

Born in 1890 in Everett, Mass., Bush cultivated his scientific interests while a mathematics student at Tufts and a graduate student in electrical engineering at M.I.T. In the 1920's, when American engineering was in transition from the improvisatory pragmatism of the past to the science-based approach of the future, Bush became known for blending traditional scientific values with the emerging professional ones. At ease in the machine shop as well as in the laboratory, he spoke of himself as using both the hand and the head.

M.I.T, which was in the vanguard of this professional transition, adopted Bush as an exemplary faculty member and later named him dean. He won worldwide peer recognition as the foremost designer of electromechanical analog computers. Decades later, his Atlantic Monthly article "As We May Think" spread the notion of mechanizing the storage and retrieval of information, an idea that fired the vision of several computer pioneers. Zachary, a business and technology reporter for The Wall Street Journal, has aptly subtitled his biography "Engineer of the American Century."

Bush assumed that men of brains, judgment and good will would rise to positions of responsibility in the engineering and scientific world. (He was not at all sure that this was true in political and military realms.) An elitist holding high academic standards, he believed that university engineers should reach out to render public service, not only solving problems assigned to them, but helping to formulate policy as well. This agenda would bring him into sharp conflict with the Washington establishment.

After World War II began in Europe, Bush, answering a call from Washington to mobilize engineers and scientists for national defense, put together the Office of Scientific Research and Development. Contemporaries called it the greatest research and development organization in history. Its story has often been told, but Zachary goes deeper to explore Bush's influential and often controversial views on the role of experts in a democracy, an issue that surfaced then and that remains only slightly below the surface now.

Bush and elitist science associates like James

Thomas P. Hughes is a professor of the history of science and technology at the University of Pennsylvania and M.I.T.

Conant, the president of Harvard, sharply criticized the military for not developing strategy and tactics that incorporated new weapons, such as radar and the proximity fuze. Bristling with impatience, Bush used his direct access to Franklin D. Roosevelt, as well as his freedom from Congressional oversight and his huge budget, to bring pressure on generals and admirals to accept scientists and engineers as partners in making policy.

Turf battles were inevitable. The Chief of Naval Operations, Adm. Ernest J. King, a formidable opponent, accused Bush of "trying to mess into things in connection with the higher strategy which were not his business, and on which he could not have any sound opinions." Other officers scornfully dismissed the civilian experts as men without combat experience.

Bush's advocacy of unfettered scientific expertise brought criticism from the politicians as well. The United States budget director, Harold Smith, declared that Bush "is too much influenced by the assumption that researchers are as temperamental as a bunch of musicians, and consequently we must violate most of the tenets of democracy and good organization to adjust for their lack of emotional balance." "Most of them," he added, "do not know even the first thing about the basic philosophy of democracy."

Undaunted, Bush, according to one colleague, talked "straight to generals and cabinet officers and the President," and made them "take it." After fierce confrontations, he would sometimes withdraw in the evenings to Washington's exclusive Cosmos Club and negotiate with his opponents over a bottle of Scotch. He often prevailed.

Jerome Wiesner, John F. Kennedy's science adviser, thought that the 20th century might not again produce Bush's equal in engineering and science policy. Alfred Loomis, a knowledgeable science patron, investment banker and radar expert, concluded that among the men whose death in the summer of 1940 would have caused the greatest calamity for America, Roosevelt was first and Bush would be second or third.

Y war's end, however, Bush was bonetired, broken in spirit and bereft of influence. Finding the Truman Administration's science policies suggestive of a chapter from "Alice in Wonderland," he left the Government in 1948. In his last great effort, he tried and failed to establish a National Research Foundation, a peacetime replacement for the research and development office, one that would cultivate fundamental science both for military and civilian uses. He wanted peacetime science unfettered by political controls, but failing to perceive a growing call for public accountability, he aroused overwhelming opposition. James V. Forrestal, the first Defense Secretary, observed that "even with both ears to the ground," Bush did "not hear the rumble of the distant drum."

Deeply informed and insightful, Zachary has thoroughly captured the spirit of Bush and his times. In evaluating the man's legacy, he honors Bush as a role model for his generation's engaged engineers. But Zachary is impatient with Bush for resisting people whom he considered government interventionists, intent upon pursuing science primarily for the ill-fed, poorly educated and underemployed. Zachary is surely right in concluding that Bush's single-minded support of elitist universities and his advocacy of the "free play of free intellects, working on subjects of their own choice" would find little support in Washington today.

the Atomic Age Advocate of

Vannevar Bush, Engineer of the American Century
By G. Pascal Zachary
Free Press. 518 pp. \$32.50 **ENDLESS FRONTIER**

By Gregg Herken

tends to ignore the fact that the Manhattan Project was primarily ful-physicists involved Journalist G. Pasthe making of the atomic bomb an engineering effort. Historians have lavished most of their attention upon the more temperamental—and hence color-LL that has been written about

Gregg Herken, a historian at the and Edward Teller.

cists Ernest Lawrence, Robert Oppenheimer Smithsonian, is writing a book about physi-

dent of Harvard-whom he described as a "square-shooting, level-headed liberal." The pairing of Bush and Conant created and assigned the NDRC to Conant. Topartnerships in the modern history of science and technology, but it receives disappointingly little treatment in this otherwise excellent book. (Readers are advised to consult Jim Hershberg's brilliant biography of Conant, which can be read as almost a companion volume.) When World er, umbrella organization-the Office of gether, the duo not only oversaw developvictory—radar, the proximity fuse, and the bomb-but also became Roosevelt's de one of the most remarkable intellectual War II finally arrived, Bush created a larg-Scientific Research and Developmentthe decisive weapons facto science advisers. ment

he intended it as his legacy. Like the NDRC and OSRD, Bush wanted peacetime "Science-The Endless Frontier" was the 192-page plan for postwar federal support of scientific research that Bush prepared for Roosevelt as victory approached;

ography of an engineer who was once the ment, takes a major step toward setting the cal Zachary's Endless Frontier, the first bidoyen of America's scientific establishrecord straight

Vannevar Bush was a prototypical Boston Yankee whose father was a Universalist preacher and grandfather a sea cap-

men as well as things."

An inveterate tinkerer, Bush invented lyzer"—an early, mechanical version of the computer. In the mid-1920s, he co-founded before he was 40 a device to detect submarines, a code-breaking machine, a solarpowered pump, and the "differential ana-Raytheon and was made wealthy by the

brainpower for the coming conflict. The the midst of complexity"—was key to his and the NDRC's success in jump-starting the nascent atomic bomb project, which and President Franklin Roosevelt created in time to mobilize the country's scientific ued most—the ability "to think straight in hidebound bureaucrats and flighty physicists had left dead in the water. When a National Academy of Sciences panel dithered as to whether a bomb was possible, Bush quality that Bush typified and that he valadded a handful of engineers and sent them back to the drawing board; the panel decided the bomb was feasible after all

with another Bostonian-chemist James -Continued on page 5 Bush also had the talent to recognize his own limitations. "Most of this was over ies of fission. Accordingly, Bush teamed up my head," he readily admitted to physicist colleagues who were probing the myster-Conant,

subsequent growth of the electronics grant. In 1939, on the eve of World War II, he became president of the Carnegie Institusubsequent growth of the electronics nization–the National Defense Research Commitee. tain. Bush's flinty persona and wry humor reflected those origins. (His "screwball" first name was borrowed from that of a

"Bush's greatest invention was not a thing but an orga-

Yet Bush's greatest invention was not a thing but an organization-the National

neering in 1916 and set about to broaden

his horizons: "I resolved to learn about

Bush received a PhD in electrical engi-

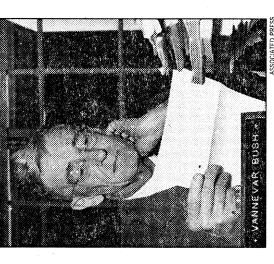
family friend.) Educated at Tufts and MIT

as a threat, and the cronies and pols who surrounded FDR's successor, Harry Truman, also feared—with some reason—that Bush's real goal was a technocracy, a gov-Bush could do little but complain and wax nostalgic about the halcyon days of the ernment by experts. Blocked at every turn, Defense Research Committee-which he tion in Washington, D.C.

coming simply a curmudgeon by two

putting people in space was merely a "stunt" that would eventually "bore the new. He was most famously wrong about ballistic missiles—"I think these things use, even if they could be built"-but his attachment to the analog technology of his coming of the information age. (In one area, Bush's naysaying may only have ism became an ossified suspicion of the will be just too expensive and inaccurate to differential analyzer likewise blinded him to the potential of digital computers, even hough he was one of the first to herald the been premature. He warned in 1960 that Over time, Bush's hardheaded pragma public" and "kill some promising youngsters in the process.")

In retirement, Bush was saved from be-



Vannever Bush in 1947

ment" rather than compete with work however, the Pentagon viewed Bush's plan government-funded research to "suppledone by the military services. Predictably,

courageous acts that received little or no ribbon panel studying disarmament, Bush tried to postpone the explosion of Ameri-Bush spoke out in Robert Oppenheimer's public attention. In 1952, while on a bluea ban on such tests could be explored by where the physicist was being pilloried for neimer hearing was arguably his finest ca's hydrogen bomb until the possibility of fruman's successor. Two years later, defense at the latter's security hearing, his opposition to the H-bomb. While for naught, Bush's heroic stand at the Oppenwar. He finally left the government in 1948.

standing "at the mouth of the cave with a ng cultural values, Zachary's book gives a glimpse into a simpler time. Vannevar Bush was the exemplar of a generation that has now vanished. Bush evoked the attitudes and standards of that generation when he wrote, in December 1940, of ry is said to be only a reflection of chang-In an era when science as well as histoew strong men of the clan armed with stone axes against a hostile world."

THE WALL STREET JOURNAL.

Arms and the Man

By Erich Eichman

It is odd to think that a man whose face appeared on the cover of Time magazine in 1944, and whose death occasioned a frontpage obituary in the New York Times 30 years later, should be all but forgotten today. But such is the fleeting fame of the



Bookshelf

"Endless Frontier" By G. Pascal Zachary

technocrat. Vannevar Bush was much more than that, of course. He was a pioneering engineer and inventor, an entrepreneur, a visionary and a social philosopher whose "Modern Arms and Free Men" was a 1949 bestseller and whose hymn to science (and appeal for funding), "Science—The Endless Frontier," caused a sensation when it was released in July 1945.

But his glory years were spent in Washington heading up various technocratic entities (the Carnegie Institution, the Office of Scientific Research and Development), advising presidents, pulling strings on Capitol Hill, worrying over funding, and overseeing projects, most notably the secret one that produced the first atomic bomb.

In his way, Bush was a precursor of the "Wise Men," the elite insiders who guided U.S. policy in the postwar years. His influence reached its height under Roosevelt and faded precipitously thereafter, but his concerns—the relation of science to government and the military, its role in society—are still very much with us.

No doubt Bush would have welcomed our computer revolution, for he was essentially an optimist who saw technology as a force for good. Most important, during the crisis years of his greatest prestige and authority—when the country was at war or preparing for it—he argued (presciently, convincingly) that science had something essential to contribute to national defense, especially if civilian researchers were allowed to do their work unmolested by military bureaucracy.

Journal reporter G. Pascal Zachary has brought this able, conscientious, energetic and wrongly forgotten man to life in "Endless Frontier: Vannevar Bush, Engineer of the American Century" (Free Press, 518 pages, \$32.50). A few excerpts:

In the 1930s: "While innovation was clearly becoming corporatized, Bush still believed that the 'lone researcher often does produce out of thin air a striking new device or combination which is useful and which might be lost were it not for his keenness.' Bush was himself just such an irrepressible inventor. While an astute manager of research teams, he often pursued his grandest intuitions alone. Rapid retrieval of personalized data, stereonbe-

tography, typography, internal combustion engines and perpetual motion were just a few of his obsessions. For him, in venting was a calling, a way of life."

At the commanding heights: "Intenselyself-assured, [Bush] deferred to no one save Roosevelt and his mentor, Henry Stimson, the secretary of war. In the heat of war, his penchant for barging ahead worked wonders. The military gave more leeway to him than perhaps any other; civilian in the war. Members of Congress granted his every request. 'Never once did' we ask for funds and fail to secure them? promptly,' Bush later boasted. Legislators. rarely even questioned him, and when they did the exigencies of war made it pos sible for him to duck the tough queries anyway. He never flatly refused to satisfy, a. politician's curiosity, but rather dared him to comprehend the technical and military. issues. Most politicos wisely kept their mouths shut.

The response to Bush's 1945 report:
"Business Week called Science—The Endless Frontier 'an epoch-making report' that is 'must reading for American business men.' The Washington Post applauded Bush for delivering a 'thorough, carefulllan for putting the needed push of the federal government behind our scientific progress.' . . Only a handful of commentators questioned Bush's basic principle that research deserved broad public funding. The Wall Street Journal, for example, argued that tax incentives could achieve a similar result by inducing private industry to spend sufficiently on research."

After the war: "[Bush] shared with other elitists a stark and not altogetherdistorted view of American society that: pitted sober, pragmatic elites against the untutored, volatile masses. For Bush, Truman and his cronies as well as most congressional leaders clearly fell into the 'masses' category. While Truman de lighted in casting himself as an ordinary American, Bush-and other elite leaderstended to view such citizens as irresponsible and sometimes irrational. The elite as: sumed that the mass of Americans needed. patriarchal authority. In Bush's viewcivilian technocrats were the solution to the inherent contradiction between the increasingly complicated problems facing government and the nation's democratic traditions. In practice, this meant that the public must pay for experts to make decir. sions in its name; these experts would brook little or no interference.

Looking back, in the 1950s: "He wordered whether men could 'live without war.' Now that 'the glamour of war it gone,' he asked whether the kind of direct combat 'that once had a real appeal for the red-blooded man' was obsolete. Others had noted that modern technology had made war impersonal and that the 'virile attributes' of war, which enlivened societies in the past, would have to arise from another source. But Bush's romantic yearning for an earlier stage of combat seemed peculiar given his role in exploiting the very technologies that further dehumanized war.

Chicago Tribune, 22 September 1997

A vivid tale of an American science czar

By David Warsh THE BOSTON GLOBE

oosevelt called me into his office and said, 'What's going to happen to science after the war?' I said, 'It's going to fall flat on its face.' He said, 'What are we going to do about it?' And I told him, 'We better do something damn quick.'

Those are the words of Vannevar Bush, longtime professor at the Massachusetts Institute of Technology and America's science czar in World War II. They evoke the Washington manners of 1944, when those in positions of responsibility understood that they trod upon a historic stage and spoke such slipped sentences easily.

Bush had served as Rossevelt's science adviser since June 1940, overseeing the development of radar, the computer, the atomic bomb, antibiotics. When Rossevelt asked for a postwar plan, Bush delivered—and in a hurry.

In just four months, he responded with a famous report, "Science—The Endless Fron-

In just four months, he responded with a famous report, "Science—The Endless Frontier," synthesising the work of a series of blue-ribbon committees. Though much battled over in the corridors of power, it nonetheless became the blue-print for the nexus between government, industry and academia that has lasted to the present day.

More than any other person, it was Bush who designed America's national system of innovation in the post-World War II erat the universities directing basic research, the federal government paying the bills and corporations concentrating on applied research, somewhere in between.

This was a good deal more fundamental than, say, thinking up the interstate highway system or inventing the television networks. It could be argued (leaving democracy aside) that it was the innovation system more than anything else that won the Cold War.

Cold War.

Bush is now the subject of a wonderful new biography by G. Pascar Zachary, "Endless Frontier Vannevar Bush, Engineer of the American Contury." It turns out that nothing he did was as important as what he

Commentary

accomplished in the years between 1939, when he went to Washington, and 1954, when he left full-time government service and returned to MIT.

Yet even Bush's failure to adjust after those great days underscores the importance of the forces he had set in motion. And in Zachary's hands, the human forces behind the strange twists of technological developments are always available for inspection.

Named for his father's roommate at Tufts College, Bush went to Tufts himself. Afterward, with his Tufts roommate, Lawrence Marshall, he started a firm to make radio tubes that they called Raytheon. The firm was a success, but Bush went on to teach electrical engineering at MIT, where he plonesred in developing analog computers. Duty called in 1939.

By far the greatest part of Zachary's book concerns the war years. And here the stories are just too numerous to do more than list. The author's day job is as a reporter for The Wall Street Journal in San Francisco. He has a journalist's eye for color and knack for narrative; he has a historian's ear for deeper concerns.

So he weaves tales of the Manhattan Project with yarns of Bush's association with the Office of Strategic Services; stories of the FDR cabinet with anecdotes from scoundrel time. (One of his finest moments came when he went to bat for J. Robert Oppenheimer, whom he saw as victim of technological differences of opinion.)

It turns out to have been a far more complicated world than Bush had contemplated. Battles over federal funding of science are recounted. Bush favored winding down the military's role in funding science at the conclusion of the war, President Harry Truman overrode him in 1945. When the National Science Foundation finally was created five years later, Bush disclaimed the agency he had imagined. He feared that it was too little, too late.

After leaving government, Bush seemed to shrink in stature. The man who had marshaled forces on a equal footing By the 1970s, U.S. industry found itself in a paradoxical situation: 'Awash in theoretical knowledge, it was starved for the basic processes and products that lead to victories in commercial contests,' according to a new biography of Vannevar Bush.

with Eisenhower, George Marshall and Chester Nimitz suddenly was a voice that found its fullest expression against the new: against guided missiles and satellites, against the race to the moon, against consumerism. He served to good effect on corporate boards, with the pharmaceutical company Merck in particular. His son founded Millipore Filter Co., he himself raised turkeys in New Hampshire.

The world was far more bottom up than the top-down world he favored, and, according to Zachary, this had deleterious effects on America's competitive position in the world economy. He writes: "The great defect of "Science—The Endless Frontier" was its neglect of industrial innovation." Science was lionized as the source of all progress; invention and commercial engineering were fobbed off as subsidiary concerns. The result was that by the 1970s, U.S. industry found itself in a paradoxical situation: "Awash in theoretical knowledge, it was starved for the basic proces and products that lead to victories in commercial contests." (Oligopolistic market structure may have had something to do with it, too.)

Nobody knows better than
Zachary how it was that, in key
industries at least, American
businesses fought their way
back to positions of global
supremacy. His first book, "Showstopper: The Breakneck Race to
Create Windows NT and the
Next Generation at Microsoft"
(now undeservedly out of print),
is a remarkable chronicle of the
development of a major piece of
software.

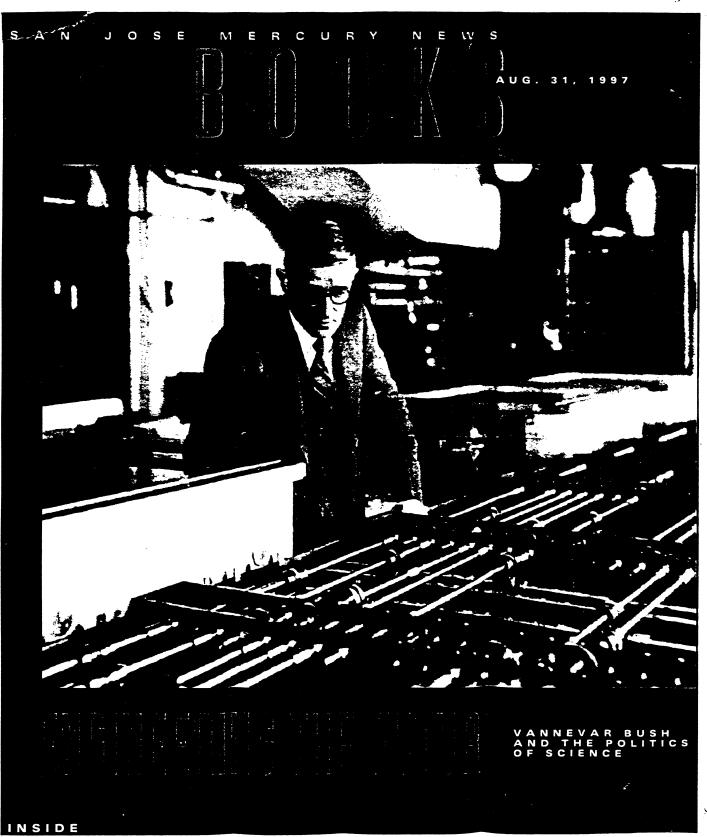
Its putative hero is Dave Cutler, who was born in 1942, when Bush was at the height of his powers in Washington. Yet by the end of the book, we understand that Cutler (once a top Digital Equipment executive) in his way has been just as effective in welding together a team hell-bent on a fixed objective as was any of Bush's minions in the war—with no higher authority behind Cutler than Bill Gates, the business strategist who built Microsoff on little more than his understanding of what it meant to be the standard.

Gates commands a research and development effort as exten sive as any ever commanded by Bush. And the commercialization of research and development that began when International Business Machines move into computing and American Telephone & Telegraph developed the transistor (and then stood by while Silicon Valley took its development to the next stage) has gone far beyond what he contemplated.

Which just goes to prove the point. Whatever its deficiencies as a plan of action, the outline first sketched in "Science.—The Endless Frontier" have evolved into a pretty good map of the territory. The relationships between the regions are better understood. So are the possibilities for failed communication. The boundaries themselves seem a little more finite; the competition for resources a little more intense.

But veterans of a hundred cowboy movies knew what hap pens next. Some guy comes through with a roll of barbed wire, or a motor car, or a machine gun, and it's off to the races again. The frontier is forever closing, at least as originally understood. And new vistas are opening all the time.

San Jose Mercury News, 31 August 1997



TAPPED OUT: Beer industry's love affair with marketing resulted in some flat Sales. Page 4

AUDIO 'AMBUSH': Tom Wolfe's first fiction in a decade travels the recording route. Page 7

A well-engineered life

■ Vannevar Bush devised policies that altered our lives

ENDLESS FRONTIER: Vannevar Bush, Engineer of the American Century By G. Paschal Zachary Free Press, 490 pp., \$32.50

BY PAUL PREUSS

CHAMPION of scientific expertise in government, Vannevar Bush's name and face were all over the covers of Time and Fortune and Newsweek in the 1940s, but today — except for the nuistaken impression that Bush foresaw the personal computer and the Internet — few remember him. Wall Street Journal reporter G. Paschal Zachary has performed a valuable service with this admirably detailed biography of a man who not only was the 20th century's leading American engineer, but who in a real sense engineered the American century.

How should history judge a man who described many of features of the PC in 1945 and inspired the pioneers of the personal computing movement, but who disparaged digital electronic computation? Bush built an enormous mechanical computer of brass and steel, known as a differential analyzer, as early as 1931. Although he helped found Raytheon in 1924 to manufacture better and cheaper electronic tubes for radios, he never lost his affection for analog computing machines. The memory in Bush's proposed desk-sized "memex" (never built) would have consisted not of magnetic tape or disks but of reels of microfilm.

How should we assess the vision of someone who headed NASA's predecessor organization, the National Advisory Committee for Aeronautics (one of his first acts was to establish a research center in Sunnyvale), but who thought rocketry was a waste of time and did his best to discourage the development of satellites, intercontinental ballistic missiles and moon rockets?

The middle years of the century, the years of World War II when Bush was at his acme, were a fulcrum for our national values, our self-image and our conception of ourselves as a distinctive people in the world. Like his times, Bush was a mass of questions and contradictions. He founded the Office of Scientific Research and Development (OSRD) and fought savage bureaucratic battles with Army and Navy brass to persuade them to invest in weapons



ASSOCIATED PRESSWIDE WORLD -- FROM ENDLESS FRONTIER

Vannevar Bush, shown here in 1942, was a high-profile engineer during World War II.

development: Because of Bush, American radar helped sweep U-boats from the sea, and the proximity fuze made anti-aircraft guns and artillery devastatingly effective.

At first Bush opposed nuclear research, thinking the prospects for a bomb "remote from a practical standpoint." He ended up launching the Army's Manhattan Project. What to think of a man who advised dropping the bomb on Japan, then wanted to share nuclear secrets with the Soviet Union — and who staunchly opposed the development of the H-bomb?

He sounds almost liberal. Not at all. Bush was so conservative he distrusted democracy. Although he was one of Franklin Delano Roosevelt's greatest admirers and closest advisers, he thought the president should be relieved of his burdens by delegating power to a committee of technical experts. During the Communist witch

Vannevar Bush set up a laboratory in his home when he was a boy.



hunts after the war. Bush failed to defend the distinguished scientist E.U. Condon, under attack by the House Un-American Activities Committee, noting that "Commie infiltration constitutes a genuine menace in this country."

A Red baiter, then? Not that easy: He was one of Robert Oppenheimer's staunchest defenders at the 1954 AEC security hearings and a scathing critic of Joseph McCarthy. In 1967, Bush recalled, "Good Lord, I worked with Hoover, Truman, Eisenhower, Roosevelt, Kennedy, and I don't think any of them ever knew what my political philosophy was or were in any way interested in it."

Born in 1890 in Chelsea, Mass., the son of a Protestant minister, Bush began his inventing career while a student at Tufts College, where he earned a patent on a sort of analog computer mounted on a wheelbarrow, a surveying device. After graduate school at the Massachusetts Institute of Technology, he eventually became a professor there, and by 1932 he was MIT's vice-president. Washington, D.C. proved to be but a short step away.

Bush advocated civilian control over military research, but through the OSRD and other organizations he did more than anyone else to establish the military-industrial complex. After the war, his opposition almost sank the National Science Foundation and the civilian-controlled Atomic Energy Commission (today's Department of Energy) and each had been his own brainchild! Bush was a masterful politician who could threaten and cajole and occasionally deceive to get what he wanted, but he had no constituency except scientists and engineers; having lost the support of younger scientists, his power quickly slipped away.

Virtually discarded by government leaders after World War II, Bush kept an office at MIT and died at home in 1974 at the age of 84. "In hindsight, how does one judge Vannevar Bush?" Zachary asks. "Right or wrong? Good or bad? Success or failure? Such questions certainly would strike Bush as absurd. ... His was a life not of looking back, but of charging ahead." Maybe a full reckoning of his importance isn't possible. Bush himself liked to say, "It is earlier than we think."

Paul Preuss' new novel is "Secret Passages."

An EE who swayed the world

GRANGER MORGAN

sk most electrical engineers to list who did most to shape the second half of the 20th century, and few are likely to include one of their own: Vannevar Bush, professor of electrical engineering at the Massachusetts Institute of Technology (MIT), co-founder of Raytheon Corp., and civilian director of the massive U.S. R&D effort during

World War II. Yet the development of radar, the proximity fuse, effective anti-submarine warfare, and countless other innovations played the decisive role in tipping the balance of the war to the Allies and, in the longer run, in securing democracy as the preeminent form of government for industrialized states at the close of this century.

Bush was born in 1890 in a town just north of Boston, where his father was a Universalist minister, and he grew up in a nearby

community to which the family moved in 1892. He was a strong-willed young man, with a "spark of belligerency," who from time to time endured bouts of illness. He showed great promise in mathematics and science, and perhaps just as important, proved adept at building things with his hands.

Biographer G. Pascal Zachary, a senior writer for the Wall Street Journal, explains that in "tinkering in his basement, Bush shared an activity with many brainy, middle-class boys around the country. The romance of invention...was contagious... [and] Bush realized that the path of the inventor offered him perhaps the only means of achieving conventional success without sacrificing his maverick leanings."

In 1909, when Bush graduated from Chelsea High, he was an independentminded, politically conservative middleclass New Englander. He was "impatient with pomp," Zachary reports, an "outsider who resented the elite of society but hungered for recognition too." He went to Tufts University, in Boston, where he earned bachelor's and master's degrees in engineering. On one occasion, he read the textbook for a course in advance and asked the professor if he could cut classes to make some time available for other things, and just take the final exam when it occurred. The professor instead gave him the test on the spot-Bush passed and was granted credit.

After working briefly at General Electric Co., Bush entered a doctoral program at Clark University but then transferred to MIT, where he completed a thesis in the new electrical engineering department in less than a year. In 1916 he accepted a job at Tufts and, in parallel, took a position as laboratory director for American Radio and Research Corp. (Amrad). Three years later he moved to the electrical engineering department at MIT, where he expanded his program of research and industry consulting.

Bush's work at Amrad eventually con-

Endless Frontier: Vannevar Bush, Engineer of the American Century. Zącbary, G. Pascal, The Free Press, New York, 1997, 518 pp., \$32.50.



tributed to the establishment of a new company, Raytheon Corp., which grew rapidly, supplying vacuum tubes for the consumer radio market. Bush prospered along with it.

In 1932 Karl Compton, MIT's new president, made Bush vice president and dean of engineering. While the position gave him wide administrative responsibilities and greater exposure on the national scene, it did not end his research activities or consulting. Much of his research at MIT focused on analog mechanical computing machines (termed "differential calculators") and on "rapid selectors" for searching large physical files (such as banks of microfilm).

As the risk of war grew in the late 1930s, Bush became concerned with laying the R&D foundation for a conflict whose outcome, he believed, would be determined by technological prowess. He had already begun to expand his activities in Washington, D.C., when in early 1939 he was named to head the prestigious Carnegie Institution of Washington, a position that provided the springboard that soon vaulted him to the pinnacle of power.

Bush's appointment in 1940 to chair the National Defense Research Committee (NDRC), which was later transformed into the powerful Office of Scientific Research and Development (OSRD), resulted from vision, good ideas advanced

books

at just the right moment, the right friends, and superb salesmanship combined with technical accomplishment and great administrative skill. Bush built an organization that, while coordinating with the uniformed military services, defined its own research priorities and ran its own show with minimal oversight by the President and Congress.

Bush pioneered new contracting methods that mobilized the nations top scienists and engineers, with minimal red tape, to address key problems, often in their own laboratories. By 1944 "OSRD was spending \$3 million a week on 6000 researchers at more than 300 industrial and university labs." This count does not include the building of the atomic bomb by the Manhattan Project, over which Bush had responsibility through different administrative arrangements.

Readers unfamiliar with the critical role played by Bush and the OSRD in the war effort will find the central 150 pages of Zachary's biography an exciting and invaluable introduction. Details of Bush's skilful wooing and bullying of military leaders such as Admiral Emest J. King are particularly interesting. I would have preferred a few more technical details, but except for confusion between the capabilities of the German V1 and V2 weapons, those provided are accurate.

Accustomed to wielding great power with remarkably little accountability, in the post-war era Bush found it difficult to adjust to the reemergence of politics-asusual and bureaucratic regulation. He strongly supported the atomic bomb he had helped create; but he also recognized that the bomb had changed the world, and worked hard, if without much success, to put in place an international regime to manage this threat to security. On the other hand, he was slow to recognize the great strategic importance of ballistic missiles and the military uses of space. This blind spot worked to erode his standing with post-war military leaders

Bush is widely credited with being the father of the social contract that guided post-war R&D in the United States. He was the principal author of the report, 'Science the Endless Frontier," which today is perhaps the most venerated, if rarely read, icon in Federal science and technology policy circles. Zachary's account makes it clear that while many of the ideas that led to the post-war system of Federal R&D originated with Bush, and with OSRD contracting experience, Bush by no means deserves all the credit. Indeed, his strong will, plus his failure to understand the changing political landscape, did much to delay the creation of the National Science Foundation

In Zachary's account, Bush is an immensely impressive man to whom the country and the Western world owe a great debt of gratitude. He was also human, with an ego, a strong and sometimes abrasive style, and other failings and limitations. These are recounted with an honesty that in no way detracts from Bush's great achievements as an engineer, as an entrepreneur, and as an excellent R&D administrator.

Most of the "big names" in U.S. science and technology policy have started out in science, especially physics. But this fascinating and well-written biography is a reminder that one of the greatest of them all, and perhaps the most influential, was an electrical engineer.

Granger Morgan is the Lord Chair Professor of Engineering at Carnegie Mellon University, Pittsburgh, where he also is head of the department of engineering and public policy and a member of the faculty in electrical and computer engineering.

Proposals for discussion at Physics Today retreat

The following proposed agenda items are in the spirit of Steve's invitation to put our concerns "on the table." This list was put together by some of the staff, based on discussions among staff members. The theme of these proposals derives from the main points raised by the Physics Today advisory committee: openness, staff empowerment and editorial efficiency. The proposals address issues that are very important to at least some of the staff, and they are intended to provide a basis for discussion. Each proposal is subject to adoption, modification or rejection during the retreat. PLEASE ADD TO THE LIST.

- Agreement that we want to keep all the present staff members.
 - -- Security is a prerequisite for speaking freely, sharing ideas and experimentation.
- 2. Openness.
 - -- Recognize that all staff members are legitimately concerned about all aspects of the magazine -- both content and process.
 - -- Proposed changes in magazine's content or process should be announced to the staff and discussed.
 - -- Make letters to the editor available to all staff.
- 3. Volunteer reporters -- a staff-based information system.
 - -- Reporter gathers and disseminates information on progress toward agreed-upon goals. Not intended to replace management's information system. (Example: reporting on progress toward hiring someone to categorize books.)
- 4. Problem resolution: Editorial and other.
 - -- Editorial judgment: Burden of proof on critic.
 - -- In disputes, staff members are encouraged to consult others on staff.

- 5. Distribute work according to staff interest.
 - -- Adjust job descriptions of yet-to-be-hired editorial and secretarial staff members based on current staff interests.
- 6. Physics Today management should act in a way that leads staff to see them as their advocates rather than as the local representatives of higher management.
 - -- Advocates in editorial controversies.
 - -- Advocates in annual reviews.
- 7. Voluntary staff participation in hiring.
 - -- Participate in writing job advertisements.
 - -- Examine resumes.
 - -- Talk to candidates.
 - -- Offer recommendations.
- 8. Take affirmative action to increase diversity of Physics Today staff.
- 9. Allow staff to solicit outlines for articles.
- 10. No need for detailed schedules.

(Distribution: All PT staff and managers.)

5 November 1997

Marc,

Thank you for asking me to meet with you today about my statement to the Physics Today advisory committee that the magazine has failed to live up fully to its claim that it is an affirmative-action employer.

I am taking this opportunity to outline the history of the issue at the magazine and to discuss the important difference between equal opportunity and affirmative action.

At a November 1996 Physics Today meeting, some of us on the staff raised the issue of affirmative action and the lack of diversity at the magazine. Several weeks earlier, one of the Physics Today editors had submitted his resignation, thus presenting us with an immediate opportunity to work toward correcting the problem. At the meeting, I said I would help monitor the situation in the future, as did Jean Kumagai, who is the only minority among the 18 individuals who work at Physics Today.

On 14 April 1997 the Physics Today staff learned that out of the 85 applicants for the editorial opening at the magazine, three had been selected to come in for interviews — all white males. Among the 85 applicants were a number of potentially qualified minorities and women. Jean and I argued that if Physics Today were truly committed to affirmative action, it would also bring in some of these applicants. That could have been done easily, but Charles Harris and Steve Benka refused, saying that it was not worth the delay of a week or so that it would cause. We felt that this revealed Physics Today's priorities (and AIP's, too, because Charles had told us that he had discussed the institute's affirmative action policy with Terri Braun after the November 1996 staff meeting), and that affirmative action clearly was low on the list.

The decisive factor turned out to be that while Charles believes in equal opportunity, he does not believe fully in affirmative action. He told me, for example, that he would not hire a minority who is qualified to do the job unless that individual was more qualified than all 84 of the other candidates. Such a policy can lead to an all-white staff even though many minorities are qualified to do the work. For reasons outside of our immediate control, qualified minorities are less likely to have credentials beyond those needed to do the work. Thus, the qualified minorities are passed over in favor of white applicants who have such superfluous credentials. The result is a staff that doesn't look like the population of people who are qualified to do the work. Thus the Physics Today staff does not look like the physics community, the journalism community, the Washington community or the nation as a whole. As long as Physics Today fails to embrace affirmative action, minorities will continue to be in the subset of applicants

deemed qualified to do the job, but rarely among those actually hired. Thus "equal opportunity" amounts to a de facto "whites only" hiring policy at Physics Today. Historically, affirmative action was instituted to overcome this shortcoming of equal opportunity.

Charles also told me that staff diversity is of no value to the magazine -- except to make the office a more interesting place to work. Therefore the fact that a particular job candidate would contribute to the diversity of the staff counts for nothing, he said.

My own concern about affirmative action at Physics Today was heightened when AIP and the magazine relocated from New York City to College Park four years ago. To fill the editorial openings created by the move, the magazine hired three individuals, all white males -- Ray Ladbury, Denis Cioffi and Steve Benka. None of the three had any journalism experience, but the magazine was willing to train them. (One could view this as an affirmative action program for white males.) If the magazine is willing to hire and train potentially qualified whites, then why not do that for minorities, too?

The managers at Physics Today made two token gestures in response to the pressure that we applied: They told a few organizations of minority scientists about the job opening, and, after they filled the position with a white male, they phoned a few of the minorities whom they had judged to be "promising candidates."

Ever since my disagreement with Charles over affirmative action at Physics Today, he has treated me a little bit like an unwelcome troublemaker. You should be able to verify any point that I have made in this note without attributing it; by doing it that way, you can avoid exacerbating this problem.





One Physics Ellipse College Park, MD 20740-3843

Tel. 301-209-3100 Fax 301-209-0843

1996 AFFIRMATIVE ACTION PROGRAM

FOR

AMERICAN INSTITUTE OF PHYSICS

Program completed by: Meresa lo. Drawr

Theresa Braun

Director of Human Resources and

EEO Coordinator

Address: One Physics Ellipse

College Park, MD 20740-3843

Program approved by:

Marc H. Brodsky

Executive Director/CEO

This Affirmative Action Program is effective from January 1, 1996 to December 31, 1996.

Member Societies:

The American Physical Society Optical Society of America Acoustical Society of America The Society of Rheology American Association of Physics Teachers

American Crystallographic Association

American Astronomical Society

American Association of Physicists in Medicine

American Vacuum Society

American Geophysical Union



INTER - OFFICE MEMORANDUM

July 11, 1996

TO:

Theresa C. Braun

FROM:

Melinda Underwood

SUBJECT:

Affirmative Action--1995

Below are the area in which AIP had underutilization in 1995:

Senior Managers

Female and Minority Underutilization

Senior Professionals

Female Underutilization

Other Professionals

Minority Underutilization

Let me know if you want to develop a narrative discussion of goals for the Affirmative Action Plan for 1996-1997.

The American Institute of Physics--Discussion of Goals (1995)

After analyzing our Affirmative Action plan and looking at the utilization analysis, it has come to the attention of the American Institute of Physics (AIP) that underutilization of minorities and females exist in the following job group:

Senior Managers (101)

Female and Minority

Sr. Professionals (201)

Female

Other Professionals (202)

Minority

The American Institute of Physics has been and will continue to be an equal opportunity employer. Our goals for increasing utilization of the above groups will include:

- Broadening the scope of our recruiting efforts. This will include expanding our recruiting outlets and resources such as utilizing the Internet, Department of Labor, and community resources for job postings.
- Exploring diversity training and continue to monitor hiring process. AIP is looking into offering diversity training for hiring managers and supervisors.
- Examining and identifying internal candidates for open positions and career development.

 This will include continuing cross job training, development of skills, and promotion of existing tuition reimbursement program.

RESPONSIBILITY FOR IMPLEMENTATION

A. <u>Executive Management Responsibility</u>

As the representative of executive management, the EEO Coordinator has primary responsibility and accountability for implementing, directing and monitoring this Affirmative Action Plan.

- 1. Implementing the affirmative action programs set forth in this Plan, including the development of policy statements and related internal and external communication procedures to disseminate those policy statements.
- 2. Developing and supervising the presentation of our equal employment opportunity policy during the supervisory training and new employee orientation programs, which may include question-and-answer sessions for supervisors and employees answering their questions about this Affirmative Action Plan.
- 3. Designing and implementing an audit and reporting system that will accomplish the following:
 - (i) Measure the effectiveness of our affirmative action programs.
 - (ii) Indicate when remedial action is needed.
 - (iii) Determine the degree to which our goals and objectives have been attained.
- 4. Advising management and supervisory personnel on developments in the laws and regulations governing equal employment opportunity.
- 5. Serving as liaison between the Company and all enforcement agencies.
- 6. Identifying problem areas and establishing goals and objectives to remedy underutilization in major job groups, if any underutilization exists.
- 7. Conferring with community organizations representing women, minorities, veterans, the disabled and older workers.

- 8. Auditing periodically our on-the-job training, hiring and promotion patterns to remove impediments to attainment of the Company's goals and objectives.
- 9. Rating supervisory employees based, in part, upon their efforts and success in furthering the goal of equal employment opportunity, and informing supervisory employees of this evaluation practice.
- 10. Discussing periodically the Company's commitment to equal employment opportunity with managers, supervisors, and employees. During these discussions, the EEO Coordinator will stress the importance of affirmative action, as well as nondiscrimination.
- 11. Reviewing the qualifications of all employees to insure that minorities and women are given full opportunities for transfers, promotions and training.
- 12. Providing access to career counseling for all employees.
- 13. Conducting periodic audits to ensure that the Company is in compliance with federal and state laws and regulations requiring:
 - (i) Proper display of posters explaining the Company's obligation to engage in nondiscriminatory employment practices.
 - (ii) Integration of all facilities which we maintain for the use and benefit of our employees.
 - (iii) Maintenance of comparable facilities, including locker rooms and rest rooms, for employees of both sexes.
 - (iv) Providing full opportunity for advancement and encouraging minority and female employees to participate in educational, training, recreational and social activities sponsored by the Company.
- 14. Counseling supervisors and managers to take actions necessary to prevent harassment of employees placed through affirmative action efforts and to eliminate the cause of such complaints. Further, the EEO Coordinator will

counsel supervisors and managers not to tolerate discriminatory treatment of any employee by another employee or supervisor and to report all complaints or incidents to him.

- 15. Establishing an internal complaint system that will enable employees to discuss complaints with the EEO Coordinator whenever they feel that they are being discriminated against on the basis of race, color, religion, sex, national origin, disability or veterans' status.
- 16. Serving as liaison between the Company and community organizations representing minorities, women, veterans, the disabled and older workers.
- 17. Developing expertise and knowledge of equal employment opportunity guidelines and regulations in order to advise and update top management and supervisory personnel concerning developments affecting our equal employment opportunity program.

B. The Responsibilities of Supervisors and Managers

All supervisors and managers must share in the day to day responsibility for implementing the affirmative action programs set forth in this plan. Specifically, they must endeavor to:

- 1. Respond to inquiries about our Affirmative Action and Equal Employment Policy, after consulting with our EEO Coordinator.
- 2. Assist our EEO Coordinator during the investigation of allegations of discrimination.
- 3. Participate in recruitment and accommodation efforts designed to enable disabled individuals, disabled veterans and others to secure employment and to advance to positions for which they are qualified.
- 4. Ensure that all federal and state posters explaining the laws prohibiting discrimination are properly displayed.
- 5. Participate in the development and implementation of affirmative action programs.

DISSEMINATION OF EQUAL EMPLOYMENT POLICY

I. <u>Internal Dissemination</u>

The Company will take the following actions to disseminate its Affirmative Action and Equal Employment Policy, as appropriate, on a regular and continuing basis.

- A. Including the Affirmative Action and Equal Employment Opportunity Policy statement in its policy manual and employee handbook, as published. A copy of our EEO Policy, which is contained in our Employee Handbook, is attached at the end of this section.
- B. Meeting with supervisory personnel to explain the intent of the Affirmative Action and Equal Employment Policy and their individual responsibilities for its implementation. We conducted supervisory training for all management about equal employment opportunity, affirmative action and sexual harassment during Plan Year 1995 and have continued the training into Plan Year 1996. We have attached information relating to our supervisory training at the end of this section.
- C. Scheduling special meetings with employees or using Company newsletters to discuss and explain individual employee responsibilities or opportunities under the affirmation action program. During the current plan year we will be conducting

equal employment opportunity in the workplace.

- D. Discussing our equal employment policy during any orientation programs we hold, at which time all new employees (and if applicable, transferred and promoted employees) will be advised of our commitment to affirmative action and equal employment opportunity. Our Affirmative Action and Equal Employment Opportunity Policy statement and policy statements affirmatively supporting the employment of minorities, veterans, the disabled and women will be explained during these sessions. During these orientation sessions a management representative from various areas of the Company, including Human Resources, explains the function of their department. Our Affirmative Action and Equal Employment Opportunity Policy statement and policy statements affirmatively supporting the employment of minorities, veterans, the disabled and women are explained during these sessions. We have attached at the end of this section an "Overview of New Employee Orientation Process", which includes a copy of our "New Employee Checklist," and addresses equal employment opportunity and affirmative action in the workplace.
- E. Posting the Affirmative Action and Equal Employment Policy, along with all required State and federal informational posters, on our bulletin boards, and updating such posters as required. Our "Affirmative Action and Equal Employment Opportunity Policy Statement", "Invitation to Vietnam Era and

IDENTIFICATION OF PROBLEM AREAS (DEFICIENCIES) BY ORGANIZATIONAL UNIT AND BY JOB GROUP

I. UNDERUTILIZATION

The EEO Coordinator conducted a Utilization Analysis for the 1996 Plan Year in which she compared the workforce representation of minorities and females to their statistical availability by job group. The Utilization Analysis led the Company to identify the following areas of underutilization:

<u>Females</u> are statistically underutilized in job groups 101 (Senior Managers) and 201 (Senior Professionals).

<u>Minorities</u> are statistically underutilized in Job Group 202 (Other Professionals Technicians).

The Company is addressing these potential problem areas by establishing goals which we will attempt to achieve through specific action oriented programs, which are described in the section of this plan entitled "Action Oriented Programs." Our Utilization Analysis and Goals are contained behind the tabs, so named, in this affirmative action plan.

II. ADVERSE IMPACT

To determine if our selection procedures have an adverse impact upon minorities and females during the first six months of our 1996 Plan Year, we conducted an adverse impact analysis upon our selection decisions. We compared the selection ratios of minorities and females to those of non-minorities and males, respectively, in the areas of hiring, promotion and termination. Through this analysis we discovered no areas for this time period of statistically significant adverse impact.

As a result of our adverse impact analysis, we examined each of the selection decisions that occurred in job groups where adverse impact was discovered as described in the Action Oriented Programs section of our plan. Furthermore, a full impact ratio analysis of our selection decisions and a narrative discussion of the legitimate business reasons supporting our decisions is found behind the "Jaar Analysis, Impact Ratio Analysis and Placement Analysis" tab.

III. IN GENERAL

In addition to the above, the EEO Coordinator will, on an annual basis, as applicable, identify potential problem areas in the total employment process, which may include review of the following areas:

A. Composition of the workforce by minority group status and sex.

- B. Composition of applicant flow by minority group status and sex.
- C. Overall employee selection process including position specifications, application forms, interviewing procedures, test administration, test validity, referral procedures, final selection process, and other employee selection procedures.
- D. New hires, promotions, terminations, etc.
- E. Utilization of training, recreation and social events and other programs that are sponsored by the Company.
- F. Technical phases of compliance with laws prohibiting discrimination in employment and promoting affirmative action programs, e.g., retention of applications, notifications to subcontractors, etc.
- G. "Underutilization" of minorities or women in specific job groups.
- H. Lateral or vertical movement of minority or female employees occurring at a lesser rate than that of non-minority or male employees.
- I. The selection process eliminating a significantly higher percentage of minorities or women than non-minorities or men.
- J. Application and other preemployment evaluation forms or procedures not in compliance with federal or state law.
- K. Position descriptions inaccurate in relation to actual functions and duties of that particular job.
- L. <u>De facto</u> segregation, by race or sex, existing in job titles or job groups.
- M. Seniority provisions contributing to overt or inadvertent discrimination by minority group status or sex.
- N. Non-support of our affirmative action and equal employment programs and policies by managers, supervisors or employees.
- O. Minorities or women significantly underrepresented in training or career improvement programs.
- P. Lack of formal techniques for evaluating effectiveness of the programs set forth in this Plan.

From: Susan Funk

To: SBENKA, JBARKER, GCOLLINS, PELLIOT, TFEDER, CHARRI...

Date: 18 Sep 1997 (Thu) 13:29
Subject: Additional Agenda items...

I have been asked to e-mail this to all of you.

-- Susan

Here are some critical topics we would like to see on the agenda for next week's Content Retreat.

(1) Revised editorial structure: implementation of the long-deferred editorial board to increase staff's participation in editorial function and decision making.

While some may regard this as "process" and not a valid part of this "content" retreat, this step is essential for any meaningful changes in content to be successfully implemented. PT has a highly talented staff that is frustrated by the current structure, which prevents the staff from making a significant and ongoing contribution to enhancing the magazine's quality. Implementing the editorial board is the best way to make the magazine's content more timely, lively, and interdisciplinary.

- All the editorial staff should be part of the editorial board.
- (2) Revised outlook: an outlook that is more independent, more daring, more thought-provoking, more representative of diverse views in the physics community, more appealing to younger readers, more responsive overall not just to our current readers but to the additional readers we would like to have, more competitive.
- (3) Added functions: to provide a forum for debate, to discuss openly issues relevant to the physics community (including controversial or contentious ones), to underscore the social context and relevance of physics.
- (4) Added department: creation of "reader viewpoint" feature in which PT publishes reader responses to questions formulated by the staff.

How this would work: In one issue we publish the topic on which we want readers to give their opinions. In a later issue, we publish a representative sampling of those opinions. Such a feature would create a lot of reader interest and could play a valuable role in the society of physicists. Our topics and the subsequent opinions could become the talk of physics coffee rooms and pre-colloquium gatherings.

(5) Revised departments: discontinue reporting of awards and job changes.

The undersigned believe that it is essential that these topics be discussed at the content retreat.

Judy Barker, Graham P. Collins, Chas Day, Paul Elliott, Toni Feder, Jean Kumagai, Elliot Plotkin, Jeff Schmidt.

16 March 1998

Dear Graham,

At the Physics Today staff meeting on 3 March, the editor announced your upcoming departure and called it simply "the big news." We found that characterization offensively neutral. The resignation of a dedicated, long-time staff member is not just "news"; it is a huge loss for both the staff and the readers of the magazine, and it is a failure on the part of the magazine. We are extremely sorry you are leaving Physics Today.

The fact that those in charge are not encouraging you to reconsider is consistent with their behavior toward you over the months, and it leads us to believe that they are not 100% unhappy about your resignation. We think they are fully aware and appreciative of your extraordinary dedication and hard work. But we think they nevertheless have mixed feelings about your presence on the Physics Today staff because you have been an outspoken voice for change at the magazine. We share your frustration over management's continued resistance to badly needed improvements, and so we find your decision to resign quite understandable. Nevertheless, we are sorry to lose you.

Of course, driving away people who point out problems will make for a seemingly smoother operation. But such maintenance of appearances comes at a very high price, because problems that are not clearly exposed cannot be adequately addressed or corrected. We have all seen this in the grossly mismanaged effort to prepare the 50th anniversary issue of the magazine. After each of the many meetings that we have had on this special issue -- meetings at which staff suggestions have been routinely ignored and important decisions routinely deferred -- staff members have whispered to each other privately, in the strongest possible terms, about the absurd amount of time and money being wasted. Nearly everyone agrees that the effort is being grossly mismanaged, but because no one has felt safe enough to bring the matter out into the open at a meeting, there has been no real discussion of how the effort could be better organized and executed. And so after all this time the managers have done nothing to improve the way it is being managed.

During the past year, Physics Today management has moved toward a more repressive work environment and toward a love-it-or-leave-it policy. As you know all too well, there is now much less pretense that "improve it" is a realistic option. Management has become suspicious of anything that could lead to change, and they act against it no matter what the cost to morale or to the readers and the physics community. Take, for example, Steve Benka's recent order forbidding private conversations between staff members at work and declaring that all conversations between staff members must be open to management supervision. Although

Charles Harris later told someone on the staff that this totalitarian measure would not be enforced, it has not been officially retracted, and so the chill remains.

Almost four months ago the Physics Today advisory committee warned that "PT could experience severe losses in its editorial staff if morale issues are not being addressed or are being addressed in a cursory manner. This issue needs continued and heightened attention from management." Physics Today management chose to ignore this warning, and now with your departure we are suffering the predicted consequence. (The magazine's loss of Susan Funk, who quietly cleaned out her desk on Friday 6 March and never came back, was also the result of frustration, we think, with the impediments to fashioning her editorial assistant position into something more than a dead-end job.)

Those in charge should not forget that Physics Today is a trust of the physics community. To needlessly lose dedicated and experienced staff members, especially those who make the extra effort to improve the magazine and the workplace, is to squander the physics community's valuable resources.

We hope some way will be found to keep you at Physics Today, although we realize that this is unlikely to happen. We have been fortunate to have you as a colleague, and we gained much from your honesty and insight. We hope you keep up the spirit in whatever you do.

19 August 1999

To: Stephen Benka, Editor, Physics Today, American Institute of Physics

From: Jeff Schmidt, Senior Associate Editor, Physics Today

Subject: My 1999 performance review (dated 13 August 1999 and signed by you on 17 August 1999)

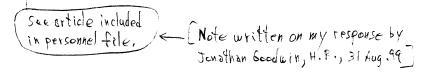
I was disappointed to find that you wrote my 1999 performance review in the same punitive spirit as my 1998 review. Like my 1998 review, the present review understates or completely leaves out my accomplishments and does not mention the praise that I have received for my work. At the same time, it contrives deficiencies and plays them up. I had thought you had gotten beyond that.

I was also surprised to see that you used an unchanged version of my 1998 review as a starting point for the 1999 review, thereby compounding many serious errors. As you know, in my memo of 27 April 1998 I brought to AIP's attention a number of serious errors in my 1998 performance review — places where statements in the review conflict with the (still existing) written record. AIP did not find fault with any of my corrections, yet you have proceeded as if they had never been brought to AIP's attention.

Hence, not perceiving a genuine interest in accuracy in these matters, let alone fairness, I will not detail here the many serious errors of fact in the 1999 review and the obvious reasons for those errors. I will just make the general statement (and give a few examples) that the 1999 review stands in conflict with the written record as much as the 1998 review did — and for the same reasons, which are detailed in my memo of 27 April 1998. The 1999 review appears to be an extension of the 1998 review: It continues the step-by-step lowering of my appraisal from above average to average to below average, even though the quality and quantity of my work remains as high as ever. Here are the examples:

1. The 1999 review states that I edited 13.5 articles for the Physics Today issues of March 1998 – September 1999. In fact I edited the equivalent of at least 17 articles for those issues: Goldstein, Sullivan, Barth, another article by Goldstein, Ramaty, De Kee, Busch-Vishniac, Hemley, Segev, Bering, Canfield, Vogel, Ertl, Redish, Bernholc and work for the May 1998 special issue amounting to the equivalent of at least two articles. The huge amount of extra work that I did for that special issue was clear to you and to everyone else at the time. I worked day and night to meet the deadline, and you even gave me the AIP "Pat on the Back" award for my "extra effort" and "outstanding performance." (See the attached pages for a copy of the award.) But my 1999 performance review rewrites history to re-estimate the amount of work that I did as the equivalent of editing one-half of an article.

I always work ahead, of course, as magazine work requires, and so I have edited an 18th article (by Clifford Will) during the stated review period (February 1998 – August 1999). However, this article will not be published in the issues counted for my 1999 review (March 1998 – September 1999), and so should not be counted for that review, even though I did the work during that period. Except for my 1998 review, that is how the accounting has been done



on my performance reviews for 17 years, and that is how it should continue to be done unless it is changed by mutual agreement, <u>before</u> the work is done. It is unfair for you to change the accounting method at the end of the review period while you are writing the review, as you did in my 1998 review (see page 4 of my memo of 27 April 1998) and as you did again in my 1999 review, when you reverted back to the long-standing method. Each of these self-serving changes reduced the number of articles credited to me on my 1999 review. The consistent and fair bottom line for my 1999 review is 17 articles, not 18 — and certainly not "13.5."

- 2. Similarly, it is unfair for you to change my job description after I have done the work. Since 25 August 1997 my three areas of work have been weighted at 70%, 25% and 5% (see your written statement of 25 August 1997, a copy of which is in the addenda of my memo of 27 April 1998.) You altered those percentages while you were writing my 1999 review to 80%, 15% and 5%, lowering my rating. I am particularly surprised that you did that, because I thought you had promised a more above-board management style after I objected to an earlier (19 August 1997), similar action on your part. (For a description of that action, see page 3 of my memo of 2 September 1997, a copy of which is in the addenda of my memo of 27 April 1998.)
- 3. Your description of the way the work on the May 1998 special issue was organized is incorrect. The editors were told to excerpt "the best of Physics Today" for that issue, and in the decade assigned to me and my partner, that material happened to center on political issues. The staff was not, in fact, required to divide the work along "physics" and "political" lines as you suggest. One pair of staff members, for example, simply divided their decade in half, with each person excerpting the best material from a five-year period. Contrary to what the review says, I did not rebuff or work less than respectfully and collegially with other staff members. In fact, I implemented my partner's suggestions, making major changes in the 8-page section to do so. My partner did not quit as you claim. Your characterization of my work with my partner is an incorrect speculation, a self-serving assumption about what might have happened. If you doubt the accuracy of anything that I have said in this paragraph, you need only ask the staff members to whom I have referred.
- 4. Contrary to your assertion, I did give you my response to my 1998 performance review. I did so verbally and we discussed it at length. You then consulted with Charles Harris about my request to correct errors in the review, and you refused to do so. I then appealed to Theresa Braun, AIP Director of Human Resources, and James Stith, AIP Director of Physics Programs. Contrary to your claim, there was nothing surreptitious about my not directing that appeal to you or about the fact that others may have seen my appeal. I had already made the appeal to you and had already discussed the issues with you.

These are just a few of the many inaccuracies in my 1999 performance review. They add to the evidently yet-uncorrected inaccuracies in my 1998 review, which should be made to conform to the written record promptly.

Finally, it is discouraging to see that it "seems" to you that I have acted to worsen the staff's morale problems, lower-than-desired respect for management and deficient cohesiveness. This speculation is way off the mark and suggests that you are looking in the wrong place to solve these very serious problems, to the detriment of the staff and the physics community.

We appreciate your outstanding performance.

Sterre



INTER - OFFICE MEMORANDUM

May 21, 1998

I, <u>Jeffrey Schmidt</u>, hereby acknowledge receipt of a cash "Pat on the Back" award in the amount of \$100. I understand that my year-end pay will reflect a "gross up" of this award.

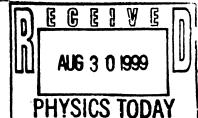
Jeffrey Schmidt DATE





"Townselly was

Work completed during review period ending 31 August 1999, but not credited.



Taken to personnel office 30 Aug. 99)

they said they would attach it to my performance review

response.

GRAVITATIONAL RADIATIONAL

Schmidt's response in August 1999 review. Should be credited in 2000 review.

Supporting Jeff AND THE VALIDITY OF GENERAL RELATIVITY

> Observing the speed, polarization, and back influence of gravitational waves would subject Einstein's theory to new tests.

> > Clifford M. Will

[Note written on article by Jonathan Goodwin,

While the detection of gravitational radiation may usher in a new era of "gravitational wave" astronomy (see the accompanying article by Barry Barish and Rainer Weiss, on page 44), it should also yield new and interesting tests of Einstein's general theory of relativity, especially in the radiative and strong-field regimes. Consequently, we are in an unusual situation. After all, we rarely think of electromagnetic astronomy as providing tests of Maxwell's theory. Neutrino astronomy may be a closer cousin: We can observe neutrinos to learn about the solar interior or about supernovae, while also checking such fundamental phenomena as neutrino oscillations. To some extent, the usefulness of astronomical observations in testing fundamental theory depends upon how well tested the theory is already. At the same time, since general relativity is the basis for virtually all discussion of gravitational-wave detectors and sources,1 the extent of its "upfront" validity is of some concern to us.

Although the empirical support for the theory of general relativity is very strong, it is still not as solid as the support for Maxwell's theory, and only in the last 35 years or so have precise tests been feasible. Furthermore, general relativity has not been tested deeply either in its radiative regime or in the regime of strong gravitational fields, such as those associated with black holes or neutron stars. (See figure 1.) Most tests, such as those carried out in the Solar System, check the theory only in its weakfield, slow-motion, nonradiative limit. One famous exception, the Hulse-Taylor binary pulsar, does provide an important verification of the lowest-order radiative predictions of general relativity and is sensitive to some strong-field aspects. Still, important tests of gravitational radiation and its properties remain undone. Furthermore, interesting, well-motivated alternative theories to general relativity still exist that are in agreement with all observations to date. Gravitational-wave tests will remain of interest to us to the extent that they can further constrain the theoretical possibilities.

There are three aspects of gravitational radiation that can be subjected to testing:

`▷ The polarization content of the waves (general relativity predicts only two polarization states, whereas other theories predict as many as six).

CLIFFORD WILL (cmw@wuphys.wustl.edu) is chair of the physics department, and a member of the McDonnell Center for the Space Sciences, at Washington University in St. Louis, Missouri.

Deliver The speed of the waves (general relativity predicts a speed the same as that of light, whereas other theories predict different speeds).

> The back influence of the emitted radiation on the evolution of the source.

In this article, we discuss the three possibilities. First, though, we review the current status of tests of general relativity.2,3

The Einstein equivalence principle

At the heart of gravitational theory is a concept called the Einstein equivalence principle, which modernizes Newton's postulate of the equivalence of gravitational and inertial mass. It states first, that bodies fall with the same acceleration regardless of their internal structure or composition (this piece of the Einstein equivalence principle is called the weak equivalence principle), and second, that the outcome of any local nongravitational experiment is both independent of the velocity of the free-falling reference frame in which it is performed (local Lorentz invariance) and independent of where and when in the universe it is performed (local position invariance).

The Einstein principle implies that gravitation must be described by a theory in which matter responds only to the geometry of spacetime. Such theories are called metric theories. General relativity is a metric theory of gravity, but so are many others, including the "scalar-tensor" theory of Carl Brans and Robert Dicke, a theory based on earlier work by Paul Jordan. Strangely enough, string theory—a leading contender for a unified theory of particle interactions and for a quantum theory of gravity—does not strictly satisfy the metric theory definition. In string theory, matter can respond weakly to gravitation-like fields, in addition to responding to geometry. Consequently, testing the Einstein equivalence principle is a way to search for new physics beyond standard metric gravity.

To test the weak equivalence principle, we can compare the accelerations a_1 and a_2 of two bodies of different composition in an external gravitational field. The resulting measurements will yield the difference in acceleration divided by the average acceleration, $2|a_1-a_2|/|a_1+a_2|$, called the Eötvös ratio after Roland, Baron Eötvös of Vásárosnamény, whose pioneering tests of the weak equivalence principle at the turn of the century formed a foundation for general relativity.

The best test so far of the weak equivalence principle has been a series of experiments carried out at the

FIGURE 1. GRAVITATIONAL WAVES expected from an inspiraling binary system of neutron stars or black holes. Height above the plane represents the amplitude of one polarization mode of waves at a fixed moment of time. The amplitude decreases with distance, both because of the usual 1/R fall-off and because waves measured farther from the source were emitted earlier in its evolution, when the emission was weaker. The doublearmed spiral pattern reflects waves from a rotating quadrupole source. Displacements induced in a detector are transverse to the radial direction. The peak at the center indicates the beginning of merger of the two objects, where the post-Newtonian approximation that was used to generate this plot breaks down and numerical solutions of Einstein's equations must be used. (Image courtesy of Laser Interferometer Gravitational-Wave Observatory.)

University
of Washington
by Eric Adelberger and
his collaborators, who dubbed
their endeavors "Eöt-Wash." They
use a sophisticated torsion balance to
compare the accelerations of various pairs of
materials toward Earth, the Sun, and the Galaxy.

Another strong bound comes from lunar laser ranging
(LURE), which checks the equality of acceleration of Earth
and the Moon toward the Sun. Figure 2 summarizes key
results. (See the article by Kenneth Nordtvedt, PHYSICS
TODAY, May 1996, page 26.)

The best tests of local Lorentz invariance consist of "clock anisotropy" experiments. Latter-day versions of the classic 1887 experiments of Albert Michelson and Edward Morley, they involve looking for variations in the rates of clocks as their orientation changes with respect to Earth's 350 km/s velocity relative to the cosmic microwave background radiation. The frame of that background would be a preferred rest frame for physics if local Lorentz invariance were violated. In the Michelson-Morley experiments, the "clocks" being compared were those defined by light propagation along the two perpendicular arms of their interferometer. The modern versions of the experiments, which use laser-cooled trapped-atom techniques to compare the transition rates of atoms as a function of their orientation, have placed exquisite bounds—as tight as parts in 10²⁶—on anomalies. (For further discussion, see the article by Mark P. Haugan and Clifford M. Will, "Modern Tests of Special Relativity," PHYSICS TODAY, May 1987, page 69.)

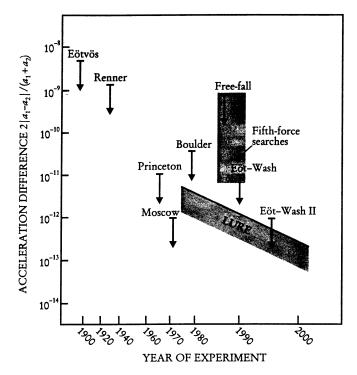
Local position invariance requires, among other things, that the internal binding energies of all atoms be independent of location in space and time, when measured against some standard atom. If that requirement is fulfilled, an intercomparison of the rates of two kinds of clocks should be independent of time and of the local gravitational potential, and the measured frequency shift between two identical clocks at different locations should be directly related to the difference in gravitational potential between the locations. The best clock anisotropy test to date has been the redshift experiment done in 1976 by Robert Vessot and Martine Levine of the Harvard Center for Astrophysics, in which they compared a hydrogen maser clock on a Scout rocket with another hydrogen maser clock on the ground.

Metric gravity and the post-Newtonian limit

In metric theories of gravity, the slow-motion, weak-field limit that incorporates the first corrections beyond Newtonian theory is called the post-Newtonian limit. Within this limit, it turns out that for a broad class of metric theories, only the numerical values of a certain set of coefficients in the spacetime metric vary from theory to theory. This framework, called the parametrized post-Newtonian (PPN) formalism, dates back to Arthur S. Eddington's 1922 textbook on general relativity; between 1968 and 1972, it was extended by Kenneth Nordtvedt Jr of Montana State University and the author.² PPN formalism is a convenient tool for classifying alternative metric theories of gravity, for interpreting the results of experiments, and for suggesting new tests of metric gravity.

PPN formalism has ten parameters. For this discussion, the most important are γ , which is related to the amount of spatial curvature generated by mass; β , which is related to the degree of nonlinearity in the gravitational field; and the four parameters ξ , α_1 , α_2 , and α_3 , which determine whether gravity itself violates a form of local position invariance or local Lorentz invariance. The combination $(1 + \gamma)/2$ governs both the deflection of light and a retardation in the propagation of light near a massive body (a retardation known as the Shapiro time delay, named for Irwin I. Shapiro of Harvard University). The "1/2" part of the coefficient corresponds to the so-called Newtonian deflection, which was derived two centuries ago by Henry Cavendish and later by Johann von Soldner. (It can also be derived by using the principle of equivalence.) The " $\gamma/2$ " part comes directly from the warping of space near the massive body. The combination $(2 + 2\gamma - \beta)/3$ modulates the advance of the perihelion of planets such as Mercury. The combination $4\beta - \gamma$ $3-10\xi/3-\alpha_1-2\alpha_2/3$ determines whether there is a violation of the weak equivalence principle for self-gravitating bodies such as Earth and the Moon—a phenomenon called the Nordtvedt effect. In general relativity, $\gamma - 1$, $\beta - 1$, and the remaining PPN parameters all vanish, as does the Nordtvedt effect.

Three decades of experiments, including the standard light-deflection and perihelion-shift tests; Lunar laser



ranging, planetary, and satellite tracking tests of the Shapiro time delay; and geophysical and astronomical observations, have placed bounds on the PPN parameters that are consistent with general relativity. The table on this page summarizes the results. To illustrate the dramatic progress of experimental gravity since the dawn of Einstein's theory, figure 3 shows a chronology of results for $(1+\gamma)/2$. These results range from the 1919 solar eclipse measurements of Eddington and his colleagues to modern-day measurements that use very-long-baseline radio interferometry (VLBI) and orbiting astrometric satellites such as Hipparcos to tests of the Shapiro time delay.

The binary pulsar

The binary pulsar PSR 1913+16, discovered by Russell Hulse and Joseph Taylor in 1974, provided important new tests of general relativity, especially for gravitational radiation and strong-field gravity. By precisely timing the pul-

sar clock, astrophysicists were able to measure the important orbital parameters of the system with extraordinary precision. Those parameters included the ones normally associated with a nonrelativistic Keplerian two-body orbit, such as the eccentricity *e* and the orbital period $P_{\mbox{\tiny h}}$, as well as relativistic parameters, such as the rate of advance of the periastron (the binary system analog of the perihelion), the combined effects of time-dilation and gravitational redshift on the observed rate of the pulsar, and the rate of decrease of the orbital period. The rate-of-decrease effect is a result of gravitational radiation damping; measuring it requires making a small correction for the effect of the galaxy's rotation on the distance to the pulsar (other possible sources of orbital damping, such as tidal friction, have been shown to be negligible).

If we assume that general relativ-

FIGURE 2. EÖTVÖS EXPERIMENTS. Selected tests of the weak equivalence principle are represented here by the bounds they set on the fractional difference in acceleration of different materials or bodies. The original purpose of the "free-fall" and Eöt-Wash experiments, as well as that of numerous others between 1986 and 1990, was to search for a fifth force. The diagonal line with shading shows current and potential bounds on the weak equivalence principle for Earth and the Moon from lunar laser ranging (LURE).

ity is provisionally correct and make the reasonable assumption that both objects are neutron stars, then all three relativistic effects depend on the eccentricity and orbital period (which are measured directly) and on the two stellar masses (which are not), and on nothing else. By combining the observations with the predictions of general relativity, we obtain simultaneously a measurement of the two masses and a test of general relativity, because the system is overdetermined. The masses turn out to be 1.4411 and 1.3873 solar masses for the pulsar and its companion, respectively, with an uncertainty of less than 0.05%. The predicted decrease of the orbital period owing to gravitational radiation damping agrees with the observed decrease to better than 0.3 %. The discovery of the binary pulsar garnered Hulse and Taylor the 1993 Nobel Prize in Physics.⁵ Other binary pulsars, such as B1534+12, B2127+11C, and B1855+09, are also yielding interesting relativistic tests.6

Binary pulsar measurements also test the strong-field aspects of general relativity, because the neutron stars that make up the systems have very strong internal gravity, which contributes as much as several tenths of the mass-energy of each body at rest (compared to the orbital energy, which is only 10⁻⁶ of the system's mass-energy). In alternative theories, such as scalar–tensor gravity, the internal self-gravity effects can lead to qualitatively new phenomena, such as the emission of dipole gravitational radiation, whose damping effect on the orbit can be significantly different from that of the usual quadrupole radiation of general relativity. No such effects induced by internal energy occur in general relativity.

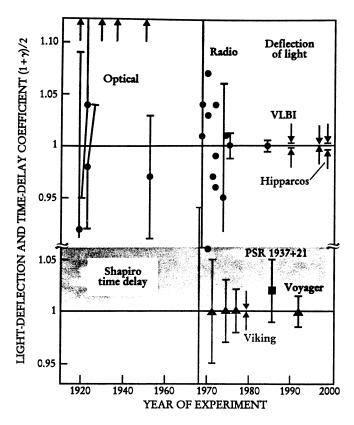
The return of scalar-tensor gravity

Among the alternative metric theories of gravity,

Current limits on the parameters of post-Newtonian gravity

	Upper limit on its		
Parameter	absolute value	Observable effect	How tested
γ-1	{ 3×10 ⁻⁴	Light deflection	Very-long-baseline radio interferometry (VLBI)
*	(2×10 ⁻³	Shapiro time delay	Mars radar ranging
β-1	3×10 ⁻³	Perihelion shift of Mercury	Planetary radar ranging
ξ	10 ⁻³	Anisotropy in gravity induced by distant matter	Gravimeter bounds on anomalies in Earth tides
α_1	4×10 ⁻¹	Anisotropy in gravity due to motion through universe	Lunar laser ranging
α_2	4×10 ⁻⁷	Precession of spin of body moving through universe	Solar spin alignment in relation to ecliptic plane
α_3	2×10 ⁻²⁶	"Self" acceleration of spinning	No anomalies in pulsar P
		body moving through universe	statistics
η	10 ⁻³	Violation of equivalence principle for massive bodies (Nordtvedt effect)	Lunar laser ranging

In terms of the six parametrized post-Newtonian parameters discussed in the text, $\eta = 4\beta - \gamma - 3 - 10\xi/3 - \alpha_1 - 2\alpha_2/3$ All parameters listed vanish identically according to general relativity.



scalar-tensor theories have played a special role. The most famous of the theories was the one developed and promoted in the 1960s by Brans and Dicke. In addition to the spacetime geometry described by a metric, g_{uv} , scalar-tensor theories postulate a scalar field Φ , that, in a standard representation, couples only to gravity itself, not to matter, thereby satisfying the requirements of metric gravity automatically. The "strength" of the scalar field is determined by a coupling constant ω such that the larger the value of ω , the weaker the scalar field. In the large ω limit, Brans-Dicke theory merges smoothly with general relativity, in that the differences between the two theories in all predictions vanish roughly as $1/\omega$. But because measurements of the deflection of light described above place the lower bound on ω at greater than 3000, Brans-Dicke theory has generally been regarded as all but dead.

During the past decade, however, new mutant strains of scalar-tensor gravity have emerged, their formulation motivated by string theory and by some models of inflationary cosmology, although they were studied in other contexts as early as 1968. In the new theories, the coupling ω is not a fixed constant but is a function of the scalar field Φ . So the theories can agree with experiment in the present Solar System—when Φ has values such that $\omega(\Phi) > 3000$ —but may be very different from general relativity in the early universe, or in strong-field regimes such as neutron star interiors. In typical cosmological models, the scalar field evolves in such a way that $\omega(\Phi)$ is driven naturally to large (though finite) values in the present epoch, independently of its value in the early universe. In a sense, general relativity is a cosmological "attractor" for such theories. The fact that the present value of ω in some models could be as small as 104, suggests interesting and reachable goals for future experiments. Not only that, but as noted earlier, some string-inspired theories introduce direct weak couplings between matter and the scalar

FIGURE 3. DEFLECTION AND DELAY OF LIGHT passing near the Sun. Plotted are values of the coefficient $(1+\gamma)/2$ based on observations of the deflection of light and of the Shapiro delay in the propagation of radio signals near the Sun (γ is a measure of the amount of spatial curvature generated by mass). General relativity predicts a value of unity for the coefficient. "Optical" denotes measurements of stellar deflection made during solar eclipses. "Radio" denotes interferometric measurements of radio-wave deflection. "VLBI" denotes very-long-baseline radio interferometry. "Hipparcos" denotes the optical astrometry satellite. Arrows indicate the anomalously large values from one of the 1919 eclipse expeditions and from other eclipse expeditions through 1947. Shapiro time-delay measurements with the Viking spacecraft on Mars yielded tests at the 0.1% level, and light-deflection measurements using VLBI have reached 0.03%.

field—and by doing that, can violate the Einstein equivalence principle.³

Future experimental tests

Much of the discussion about future gravitational experiments focuses on ways to test these new versions of scalar—tensor gravity, in the hope of limiting or discovering new physics that might arise from strings or other models of unification. The following are four promising avenues of experimental work.

 \triangleright In addition to improved ground-based Eötvös-type experiments, which could test the weak equivalence principle to the level of 10^{-14} , a proposed satellite test could reach the level of 10^{-18} .

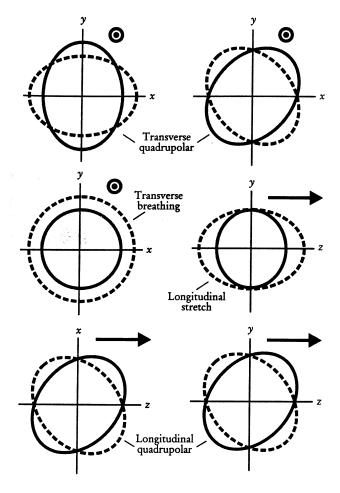
 \triangleright The Stanford–Lockheed–NASA Gyroscope Experiment, called Gravity Probe B, will measure the precession of an array of gyroscopes in Earth orbit. Although its primary science goal is a 1% measurement of the dragging of inertial frames that is caused by Earth's rotation (also called the Lense–Thirring effect), Gravity Probe B will also measure the precession caused by ordinary space curvature around the planet. Measurement of this effect could bound the coupling ω to 10^4 or higher. Launch of the mission is scheduled for late 2000.7

 \triangleright Binary pulsars could yield bounds on scalar–tensor gravity, because that theory predicts dipole gravitational radiation. Unfortunately, the bound from the Hulse–Taylor system is only $\omega > 100$, because the near identity of the two neutron stars suppresses dipole radiation by symmetry. A suitable asymmetric system containing a black hole or a white dwarf as the pulsar's companion could yield bounds on ω as high as 10^4 .

▷ Tests of the force of gravity at submillimeter ranges are being designed that could detect or bound new gravitationlike nonmetric couplings.

Gravitational-wave tests of gravitation theory

What could the direct observation of gravitational waves add to the list of tests and bounds? First, detection of the waves would in and of itself be a striking confirmation of general relativity, despite the fact that their existence is strongly supported by the binary pulsar. Here the situation is reminiscent of the case of neutrinos: the direct detection of neutrinos by Frederick Reines and Clyde Cowan in 1956 was an impressive discovery (worthy of the 1995 Nobel Prize in Physics) despite the preexisting confidence in their reality that beta decay engendered. Second, direct study of gravitational waves will check their properties as predicted by general relativity—properties that are only indirectly reflected in the damping of binary pulsar orbits. Third, gravitational waves are likely to carry the imprints of strong-gravity phenomena at the sources—



and study of those imprints could lead to tests of general relativity in the strong-field regime.

Polarization of gravitational waves. A laser-interferometric or resonant-bar gravitational-wave detector measures local relative displacements of mirrors or mechanical elements, which can be related to a symmetric 3×3 strain tensor. The tensor, in turn, can be related directly to components of the Riemann curvature tensor of spacetime generated by the wave. The six independent components of the strain tensor can be expressed in terms of polarizations, which are modes of motion with specific transformation properties under rotations and boosts. Three are transverse to the direction of propagation, with two representing quadrupolar deformations and one representing a monopole "breathing" deformation. The other three are longitudinal, with one being an axially symmetric stretching mode in the propagation direction and the remaining two being quadrupolar (see figure 4).

General relativity predicts only the first two transverse quadrupolar modes, independently of the source; this behavior goes hand in hand with the notion that, at a quantum level, gravitational waves are associated with a spin-2 particle, the graviton. Scalar—tensor theories also predict the transverse breathing mode, a spin-0 mode. More general metric theories predict up to the full complement of six modes. A suitable array of gravitational antennas could delineate or limit the number of modes present in a given wave. If evidence were found of any mode other than the two transverse quadrupolar modes of general relativity, the result would be disastrous for the theory. On the other hand, the absence of a breathing mode would not necessarily rule out scalar—tensor gravity, because the strength of that mode relative to the quadrupo-

FIGURE 4. SIX POLARIZATION MODES for gravitational waves permitted in any metric theory of gravity. Shown is the displacement that each mode induces on a ring of test particles at 0° and 180° phase. The wave propagates in the +z direction. In the three transverse modes, the wave propagates out of the plane; in the three longitudinal modes, the wave propagates in the plane. There is no displacement out of the plane of the picture. In general relativity, only the two transverse quadrupolar modes are present; in scalar–tensor gravity, the transverse breathing mode may also be present.

lar modes will depend on the nature of the source.

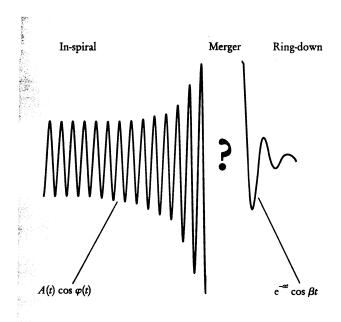
Speed of gravitational waves. According to general relativity (and scalar—tensor gravity, as it happens), in the limit wherein the wavelength of gravitational waves is small in comparison to the radius of curvature of the background spacetime, the waves propagate along null geodesics of the background spacetime. In other words, they have precisely the same speed, c, as light propagating through the same region would.

One circumstance in which the speed $v_{\rm g}$ of gravitational waves could differ from c would be if gravitation were propagated by a massive field (a massive graviton), in which case the value of $v_{\rm g}$ would depend on the gravitational wavelength λ according to $v_{\rm g}^2/c^2=1-\lambda^2/\lambda_{\rm g}^2$, where $\lambda_{\rm g}=h/m_{\rm g}c$ is the graviton Compton wavelength.

The most obvious way to check the speed of gravitational waves is to compare the arrival times of a gravitational wave and an electromagnetic wave from a single event, such as a supernova. For a source at a distance of 200 megaparsecs, a bound on the arrival time difference between electromagnetic and gravitational signals of one second would put a bound of 5×10^{-17} on a fractional speed difference. This scenario assumes, of course, that the source emits both gravitational and electromagnetic radiation in detectable amounts and that the relative time of emission can either be established to sufficient accuracy or be shown to be sufficiently small.

There is a situation, however, in which a bound on a hypothetical wavelength-dependent speed could be set by means of gravitational radiation alone. That is the case of an in-spiraling compact binary system containing neutron stars or black holes, a system that would be observed by laser interferometers such as the Laser Interferometer Gravitational-Wave Observatory (LIGO, discussed in the next article, by Barish and Weiss) and the instrument known as VIRGO. In in-spiraling compact binary systems, gravitational-radiation damping drives the binary toward smaller separations and higher orbital frequencies, a process leading eventually to a catastrophic merger. Gravitational waves from the last few minutes of those inspiraling systems will sweep through the sensitive bandwidth of LIGO/VIRGO detectors (10 to 500 Hz). We'll detect the radiation many years after the system "died." Because the frequency of the gravitational radiation sweeps from low frequency at the first moment of observation to higher frequency at the final moment, the speed of the waves emitted will vary from lower speeds at first to higher speeds (closer to c) at the end. The variation in speed will cause discernible distortion in the observed phasing of the waves. Even better tests of a wavelengthdependent speed could be obtained by observing supermassive in-spiraling double black hole systems (104 to 107 solar masses) in the centers of active galaxies by means of proposed space-based laser interferometric observatories8 in the low-frequency band around 10⁻³ Hz.

Gravitational radiation back reaction. Binary orbits inevitably decay, because of the loss of gravitational



radiation energy. It is predicted that the Hulse-Taylor binary pulsar will reach a final in-spiral and merger in 240 million years. During the in-spiral phase, the motion of two compact bodies (neutron stars or black holes) can be described accurately by equations that treat Newtonian motion as the first approximation and include post-Newtonian corrections in increasing powers of v/c, where v is the orbital speed. The corrections include radiation back reaction. The evolution of the orbit is imprinted on the phasing of the emitted waveform, to which broadband laser interferometers are especially sensitive, because the data can be cross-correlated against theoretical templates derived from general relativity. Indeed, the sensitivity of the interferometers is expected to be so high that the equations of motion describing the orbit must be accurate to order $(v/c)^{11}$ beyond ordinary Newtonian gravity. Several groups are now engaged in the formidable task of deriving equations of motion from general relativity to that high order.9

This extraordinary accuracy will provide an opportunity to conduct further tests of general relativity. When spins and tidal effects can be ignored, the motion depends only on the two masses. As in the case of the binary pulsar, measuring the various post-Newtonian correction terms in the signal leads to a highly overdetermined situation, in which we can measure the two masses accurately, and simultaneously test general relativity. One additional test, for example, arises from a contribution—to the gravitational-wave signal and to the back reactionknown as the tail. The tail is a fundamentally nonlinear gravitational effect caused by backscattering of the outgoing gravitational waves off the local spacetime curvature generated by the binary system itself. The action of the tail results in a unique and expected contribution to the phasing of the waves, one that can be tested.

Scalar–tensor gravity can also be tested by means of such observations. The generation of dipole gravitational radiation by an asymmetric binary (for technical reasons, a binary consisting of a neutron star and a black hole is best) modifies the gravitational-radiation back reaction and the observed phasing of the waves. The fortuitous discovery of such a system could lead to a bound on the scalar–tensor coupling constant ω that exceeds current Solar System bounds.

Testing general relativity at strong fields

Finally, the in-spiraling and merger of two compact

FIGURE 5. GRAVITATIONAL WAVEFORM expected from compact binary in-spiral, merger, and ringdown of a final black hole. During the in-spiral phase, a post-Newtonian approximation carried to high powers of v/c beyond Newtonian order accurately describes the orbit and waveform, with amplitude A(t) and phase $\varphi(t)$ that evolve nonlinearly with time. The merger waveform is unknown at present; to determine it is the primary goal of numerical relativity. The ring-down waveform is a superposition of damped normal modes. For each mode, the damping coefficient α and frequency β have been thoroughly calculated by means of perturbation theory and have been cataloged as functions of the mass and spin of the black hole.

objects, or the core collapse in a supernova, involve the physics of spacetime curvature in the limit of strong, highly dynamical fields, as well as the formation and evolution of black hole event horizons. Although this physics is so complex that quantitatively precise tests of general relativity are not likely to be realized, making qualitatively striking tests may nevertheless be possible. For example, the gravitational-wave signal generated by the in-spiraling and merger of two compact objects to form a black hole, and the waves emitted during the ring-down of the final black hole in its discrete set of normal modes, will be imprinted with the masses and spins of the in-spiraling objects and the mass and angular momentum of the final black hole. The signal will reflect dynamical, strong-field general relativity in its full glory (see figure 5). Finding firm predictions for the waves to compare the observations against requires solving Einstein's equations in a regime in which post-Newtonian methods fail. Only large-scale numerical computation has a hope of yielding reliable results. This challenging task has been taken up by many "numerical relativity" groups around the world. 10 The discovery and study of the formation of a black hole by means of gravitational waves would provide a stunning test of relativistic gravity.

I have adapted this article from a talk I gave at the April 1998 meeting of the American Physical Society. My work is supported in part by the National Science Foundation.

References

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- 2. For reviews, see C. M. Will, Theory and Experiment in Gravitational Physics, Cambridge U. P., Cambridge, England (1993). See also C. M. Will, in Gravity from the Hubble Length to the Planck Length: XXVI SLAC Summer Institute on Particle Physics, L. Dixon, ed., ****Name of publisher?****, in press, available on the Web at http://www.slac.stanford.edu/gen/meeting/ssi/1998/manu_list.html. For a popular accounting, see C. M. Will, Was Einstein Right? Basic Books, New York (1993, reprinted 1998).
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- 9. L. Blanchet, in Marck and Lasota, p. 33.
- See the following articles in Marck and Lasota: E. Müller, p. 273; K. Oohara, T. Nakamura, p. 309; E. Seidel, W.-M. Suen, p. 335; S. Bonazzola, E. Gourgoulhon, J.-A. Marck, p. 257.

Probe prompts concerted defense of the staff's right to discuss workplace issues privately

From:

Stephen Benka

To:

Jeff Schmidt 8/19/99 7:09pm

Date: Subject:

First thoughts on your response to the review

Jeff.

Because you didn't have time to discuss your response to your review when you gave it to me, here are my initial thoughts on the inaccuracies that you perceive. Let's discuss this further as soon as possible.

Your example #1: You neglected to mention that, initially, you had wanted to count Goldstein as one long article, not two. However, because you had completed Goldstein within the previous review cycle, and because you were two full articles short of your already reduced (because of your cancelled paternity leave) production goal for last year, we counted them as two and included them in that cycle. This ensured that you would receive an "acceptable" rating, which was clearly in your best interest.

Each editor who worked on decadal excerpts for the anniversary issue did the equivalent of one full article's work in his or her decade. There would be no reason to count yours otherwise, except that your work on your decade had to be largely redone by someone else.

As of today, to my knowledge, the Will article is not yet completed. If it were, I would count it as an article completed within this review period.

Your example #2: You are right that I should have discussed the change of weights with you. I apologize for not having done so. Let's discuss and agree on your job description as soon as possible.

Your example #3: My description is accurate.

Your example #4: Your appeal to Charles Harris, Theresa Braun, and James Stith was the proper procedure to follow. However, as we discussed earlier today (and at other times), your surreptitious circulation of your response to the staff was entirely inappropriate.

I still would like you to tell me which member or members of the staff you have discussed this year's review with.

-Steve

Here my supervisor, in response to my discussions with coworkers about workplace issues mentioned on my review, repeats his demand to know which employees were involved in those discussions.

Messages to my coworkers Paul Elliott, Toni Feder, Jean Kumagai and Warren Kornberg

Juno e-mail printed Fri, 20 Aug 1999 14:14:46, page 1

From: Jeff Schmidt <jeff-schmidt@juno.com> Received: (from jeff-schmidt@juno.com)

by m4.jersey.juno.com (queuemail) id EJGYUQBF; Fri, 20 Aug 1999 14:04:47 EDT

Return-path: jeff-schmidt@juno.com

To: lugenbold@juno.com, tfeder@wam.umd.edu, jak@interport.net

Cc: jeff-schmidt@juno.com

Date: Fri, 20 Aug 1999 14:04:47 EDT

Subject: Naming names

Message-ID: <19990820.140725.15951.0.jeff-schmidt@juno.com>

X-Status: Read X-Mailer: Juno 1.49

Hi Paul, Toni and Jean,

I just sent the message below to Warren. I don't know if he will get it before Tuesday, when he is next in the office. As you will see, it applies to you, too, but I thought it would be best to keep the message to Warren separate. (Please be careful not to mention his name in the context of this stuff.) Any suggestions or offers?

Jeff		

Hi Warren,

My discussion with Steve Benka about my performance review took place yesterday afternoon (Thursday 19 August 1999). It went more or less as expected (he basically didn't budge), except for one thing: He indicated that what he said about me in the review was confidential. At first I took that to mean that the review was confidential like a doctor's report, which goes only to the patient, to protect the patient's privacy. But it quickly became clear that what he meant was that he didn't want me to tell anyone what he said about me in the review -- for his protection, not mine.

I responded by saying that most of the staff doesn't understand "confidential" to mean that they are forbidden to talk about their reviews (it is often necessary to talk about a review to check its accuracy), and I pointed out that they commonly discuss such things with their coworkers. Besides, I said, in this case it's too late, because I have already discussed it with a coworker (more than one, actually), and I didn't ask that person not to discuss it with others. So lots of people could know about it by now (I'm sure they do).

Benka appeared to be genuinely surprised and disturbed that people talk to each other about these things. I told him that I was surprised that he was surprised. I said that lots of people here talk to each other about everything, and that's a good thing -- it's a sign of closeness. He was also disturbed that I had discussed the review with a coworker, and he asked me to tell him who it was. (I won't do that, of course.) I said that I didn't want to get anyone in trouble. He indicated that he still wanted to know. So I offered to ask the person if it would be ok to mention his or her name. At the end of the meeting, Benka said again that he wanted to know who it is. And a few hours later, at the end of a not-very-interesting e-mail message to me about other aspects of the review, he wrote this:

Juno e-mail printed Fri, 20 Aug 1999 14:14:46, page 2

>I still would like you to tell me which >member or members of the staff you have >discussed this year's review with.

>--Steve

So I am now contacting all the people whom I think know about my review, to get their ideas on what I should tell Benka.

Jeff

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Juno e-mail printed Sat, 21 Aug 1999 01:29:13, page 1

From: Toni Feder <tfeder@wam.umd.edu>

Received: from mx2.jersey.juno.com (mx2.jersey.juno.com [209.67.34.54]) by m4.jersey.juno.com with SMTP id AAA555HGZAWJHMDS for <jeff-schmidt@juno.com> (sender <tfeder@wam.umd.edu>);

Fri, 20 Aug 1999 14:22:15 -0400 (EST)

Received: from mx5.boston.juno.com (mx5.boston.juno.com [205.231.100.53]) by mx2.jersey.juno.com with SMTP id AAA555HGZATTN59J for <jeff-schmidt@juno.com> (sender <tfeder@wam.umd.edu>); Fri, 20 Aug 1999 14:22:15 -0400 (EST)

Received: from wilson.acpub.duke.edu (wilson.acpub.duke.edu [152.3.233.69]) by mx5.boston.juno.com with SMTP id AAA555HGZAKSV2Y2 (sender <tfeder@wam.umd.edu>); Fri, 20 Aug 1999 14:22:15 -0400 (EST)

Received: from wam.umd.edu (async249-51.async.duke.edu [152.3.249.51]) by wilson.acpub.duke.edu (8.8.5/Duke-4.6.0) with ESMTP id OAA02801;

Fri, 20 Aug 1999 14:22:11 -0400 (EDT)

Return-path: <tfeder@wam.umd.edu> Reply-To: tfeder@wam.umd.edu

To: Jeff Schmidt <jeff-schmidt@juno.com> Cc: lugenbold@juno.com, jak@interport.net Date: Fri, 20 Aug 1999 14:25:15 -0400

Subject: Re: Naming names

Message-ID: <37BD9D7F.A57F16F9@wam.umd.edu>

References: <19990820.140725.15951.0.jeff-schmidt@juno.com>

X-Status: Read

X-Mailer: Mozilla 4.04 (Macintosh; I; PPC)

Hi Jeff, Jean, Paul,

obviously I don't think you should tell Steve whom you discussed your review with. Since he is so harsh with you, it would only impugn those people by association -- why does he want that info? It seems he would use (or at least hold) it against us. So I absolutely don't want him to know I am among those people. Also, don't forget, Chas is among those people.

I don't know what you should tell him-- just that the person/people involved felt that it would be used against them? Or more simply, they felt uncomfortable with that request? something like that.

Maybe you could say something like, "The conversations I had with (some of) my coworkers were private, and they feel it would be an invasion of their privacy for me to reveal their names just because they talked with me. I'm sorry I can't reveal anyone's name."

You could add something reassuring, if you can think of anything. Something to let him know you are not planning or inciting a rebellion among the staff....

Toni

From: "Jean A. Kumagai" <jak@interport.net>

Received: from mx2.jersey.juno.com (mx2.jersey.juno.com [209.67.34.54])

by m4.jersey.juno.com with SMTP id AAA555KHSAZ77UWS

for <jeff-schmidt@juno.com> (sender <jak@interport.net>);

Fri, 20 Aug 1999 14:56:48 -0400 (EST)

Received: from mx5.boston.juno.com (mx5.boston.juno.com [205.231.100.53])

by mx2.jersey.juno.com with SMTP id AAA555KHSAXKWHG2

for <jeff-schmidt@juno.com> (sender <jak@interport.net>);

Fri, 20 Aug 1999 14:56:48 -0400 (EST)

Received: from amsterdam.interport.net (amsterdam.interport.net [199.184.165.19])

by mx5.boston.juno.com with SMTP id AAA555KHSAPY897A

(sender <jak@interport.net>);

Fri, 20 Aug 1999 14:56:48 -0400 (EST)

Received: from [209.122.227.240] (209-122-225-172.s172.tnt1.nyw.ny.dialup.rcn.com [209.122.225.172])

by amsterdam.interport.net (8.8.5/8.8.5) with ESMTP id OAA01347;

Fri, 20 Aug 1999 14:56:57 -0400 (EDT)

Return-path: <jak@interport.net>

In-Reply-To: <37BD9D7F.A57F16F9@wam.umd.edu>

To: tfeder@wam.umd.edu, Jeff Schmidt <jeff-schmidt@juno.com>

Cc: lugenbold@juno.com, jak@interport.net

Date: Fri, 20 Aug 1999 14:58:36 -0500

Subject: Re: Naming names

Message-ID: <v03110711b3e35d5dc946@[209.122.227.240]> References: <19990820.140725.15951.0.jeff-schmidt@juno.com>

X-Status: Read

Hi Jeff (and Toni and Paul),

I don't know what would be the best way to respond to Benka. I personally don't mind if you tell him you talked to me. On the other hand, if you think it would be stronger to say that nobody wanted their name revealed for fear of retribution, then I definitely do not want you to mention my name.

You can also tell Benka that I agree with everything in both of your responses to your performance reviews, that I'm appalled by his deviousness, that I consider you to be an extremely supportive and valuable colleague, and that the long-standing morale problem at PT (which obviously did not originate with your distributing your appeal to the staff) will only get worse if he doesn't improve his attitude. You might also add that management's increasingly repressive policies may soon lead to the voluntary departure of one of its best editors. :)

Should I tell anybody else on the staff about your review? It will have to

wait until after I get back from Maine.

Jean

At 2:25 PM -0400 8/20/99, Toni Feder wrote: >Hi Jeff, Jean, Paul, > >obviously I don't think you should tell Steve whom you discussed your review >with. Since he is so harsh with you, it would only impugn those people by >association -- why does he want that info? It seems he would use (or at least >hold) it against us. So I absolutely don't want him to know I am among those >people. Also, don't forget, Chas is among those people. > >I don't know what you should tell him-- just that the person/people involved >felt that it would be used against them? Or more simply, they felt >uncomfortable with that request? something like that. > > >Maybe you could say something like, "The conversations I had with (some of) my >coworkers were private, and they feel it would be an invasion of their privacy >for me to reveal their names just because they talked with me. I'm sorry I >can't reveal anyone's name." >You could add something reassuring, if you can think of anything. Something to >let him know you are not planning or inciting a rebellion among the staff.... >Toni

From:

Warren Kornberg

To:

Jeff Schmidt

Date:

8/20/99 8:11pm

Subject:

Re: Naming names

Jeff:

1--e-mail is not confidential, and if you want to be sure, it should not be used for things (like naming names) you do not want discussed.

2--I don't think there is any reason you should be required to disclose conversations you might or might not have had with other people in the building. With whom you discuss your business is your business. If you want to tell him you talked to me, that, too, is your business; I don't really care. But as you spell it out, the demand seems high-handed.

3--As far as the review's confidentiality is concerned, I believe that it is, but as a restriction on the management, not on you.

>>> Jeff Schmidt 08/20/99 01:42PM >>> Hi Warren.

My discussion with Steve Benka about my performance review took place yesterday afternoon (Thursday 19 August 1999). It went more or less as expected (he basically didn't budge), except for one thing: He indicated that what he said about me in the review was confidential. At first I took that to mean that the review was confidential like a doctor's report, which goes only to the patient, to protect the patient's privacy. But it quickly became clear that what he meant was that he didn't want me to tell anyone what he said about me in the review—for his protection, not mine.

I responded by saying that most of the staff doesn't understand confidential to mean that they are forbidden to talk about their reviews (it is often necessary to talk about a review to check its accuracy), and I pointed out that they commonly discuss such things with their coworkers. Besides, I said, in this case it's too late, because I have already discussed it with a coworker (more than one, actually), and I didn't ask that person not to discuss it with others. So lots of people could know about it by now (I'm sure they do).

Benka appeared to be genuinely surprised and disturbed that people talk to each other about these things. I told him that I was surprised that he was surprised. I said that lots of people here talk to each other about everything, and that's a good thing -- it's a sign of closeness. He was also disturbed that I had discussed the review with a coworker, and he asked me to tell him who it was. (I won't do that, of course.) I said that I didn't want to get anyone in trouble. He indicated that he still wanted to know. So I offered to ask the person if it would be ok to mention his or her name. At the end of the meeting, Benka said again that he wanted to know who it is. And a few hours later, at the end of a not-very-interesting e-mail message to me about other aspects of the review, he wrote this:

>I still would like you to tell me which >member or members of the staff you have >discussed this year's review with. So I am now contacting all the people whom I think know about my review, to get their ideas on what I should tell Benka.

Jeff

PS -- Careful with those computer buttons! I just noticed that your brief e-mail message to me yesterday morning also went out to Jeff Bebee, Georgina Guagenti and advtsg. No harm done.

Juno e-mail printed Mon, 23 Aug 1999 01:34:13, page 1

From: Paul J Elliott < lugenbold@juno.com>

Received: from mx1.jersey.juno.com (mx1.jersey.juno.com [209.67.33.54])

by m4.jersey.juno.com with SMTP id AAA56BC8WANXWDKA for <jeff-schmidt@juno.com> (sender <lugenbold@juno.com>);

Sun, 22 Aug 1999 19:46:28 -0400 (EST)

Received: from m6.boston.juno.com (m6.boston.juno.com [205.231.101.197]) by mx1.jersey.juno.com with SMTP id AAA56BC8WAJ6CKW2 for <jeff-schmidt@juno.com> (sender <lugenbold@juno.com>);

Sun, 22 Aug 1999 19:46:28 -0400 (EST)

Received: (from lugenbold@juno.com)

by m6.boston.juno.com (queuemail) id EJNQ7AHQ; Sun, 22 Aug 1999 19:46:11 EDT

Return-path: < lugenbold@juno.com>

To: jeff-schmidt@juno.com

Cc: tfeder@wam.umd.edu, jak@interport.net

Date: Sun, 22 Aug 1999 19:46:11 EDT

Subject: Re: Naming names

Message-ID: <19990822.202344.4631.0.Lugenbold@juno.com> References: <19990821.120842.14367.0.jeff-schmidt@juno.com>

X-Status: Read X-Mailer: Juno 1.49

Jeef (Jean, Toni too):

I think Warren is correct, but I further recommend that you tell Benka nothing other than that, having discussed the matter further with people you trust and respect, you have decided to tell him nothing more about any performance-review-related discussions you have had with AIP employees, non-AIP journalists, or outside lawyers.

And tell him so in writing, on the chance that you can develop a Benka-incriminating paper/electron trail.

To that end, I also recommend that you consider preceding that memo with one of inquiry, asking him to tell you why he wants you to name names, and what he intends to do once he knows those names.

However, If you have no stomach for ensnaring him, then I suggest you simply request that he cease harassing you with threats, demands, gag orders, trumped-up allegations, and ad hoc declarations of confidentiality. You could also be kind and offer to send him some easy-to-understand information on such topics as freedom of speech and the right of assembly.

Paul

>	
>Jeff:	
>I don't think there is any reason you should be required to disclose	
conversations you might or might not have had with other people in the	
>building. With whom you discuss your business is your business. If	
>you want to tell him you talked to me, that, too, is your business; I	
on't really care. But as you spell it out, the demand seems high-handed.	
>	
>As far as the review's confidentiality is concerned, I believe that it is, but	
as a restriction on the management, not on you.	
>W	
> w >	
>	
> 	
>Hi Warren,	
>111 wanten,	
> Thank you for basing your response to Benka's demand on principle, rather	
than on fear.	
than on lear.	
> I am still thinking about what to tell him, but I am leaning very strongly	
> I am still thinking about what to tell him, but I am leaning very strongly toward not giving him any names, even though you and some others have given me	
toward not giving nim any names, even though you and some others have given me	
permission to do so. I don't want to give the appearance of finding a	
totalitarian request acceptable.	
One thing I am thinking about doing is simply quoting people's responses	
(yours and about three others), leaving out their names and anything else that	
might identify them, and also leaving out the sentences where they give me	
permission to mention their names.	
> If Benka wants to know more, he can ask individual staff members whether or	
not I discussed my review with them. One useful response might be to simply tell	
him the truth that I said that I was trying to determine whether or not the	
review was accurate, and so we went over the review and compared it to the facts	
as we remembered them. And, of course, let him know the outcome. Another	
response might be to refuse to report on private conversations but to say that	
someone did show you the review and that you are willing to discuss its	
>accuracy. Whatever; I'm not worried; Benka doesn't present much of an	
>intellectual challenge in these or other matters.	
>	
>Jeff	
>	
>	
>	
>	
>	
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Juno e-mail printed Mon, 6 Nov 2000 16:01:37, page 1

From: Jeff Schmidt < jeff-schmidt@juno.com > Received: (from jeff-schmidt@juno.com)

by m4.jersey.juno.com (queuemail) id EJPQWQT4; Mon, 23 Aug 1999 05:00:46 EDT

Return-path: jeff-schmidt@juno.com

To: jak@interport.net, lugenbold@juno.com, tfeder@wam.umd.edu

Cc: jeff-schmidt@juno.com

Date: Mon, 23 Aug 1999 05:00:46 EDT

Subject: Naming names

Message-ID: <19990823.050304.14375.0.jeff-schmidt@juno.com>

X-Status: Read X-Mailer: Juno 1.49

Dear four colleagues who saw my annual review and who Benka wants me to name,

Taking everyone's suggestions into account, my current thinking is to not give Benka any names and to not give him anything in writing. I would give him a verbal report that would include the four responses (below) to his demand. Even though I have removed your name, I won't include your response in my oral report without your approval. So please find it below and let me know if it is ok; modify it if necessary.

As one of you suggested (and as I had decided, too), I would first ask Benka why he wants the names. To him, I think, the problem isn't the out-to-get-you review; it's the fact that I disclosed it and criticized it. If he comes around asking, "Did Jeff talk to you about his performance review?", feel free to say "yes" or "I don't feel comfortable reporting on private conversations" or "I don't feel comfortable reporting on private conversations, but I am familiar with the review and can talk about that." I'd probably be better off if you didn't say who showed you the review, and if you didn't say that you saw any written response to it.

My spoken report to Benka would be something like this:

Following up on your request, I was able to track down four colleagues who saw my annual review either because I showed it to them or because someone else did. They all reacted negatively to your request for their names, so I'm afraid I don't have any names to report. The most I can do is tell you what they told me when I asked for permission to identify them. Would that be of any use to you? [At this point Benka says yes and I read the following responses.]

1. Obviously I don't think you should tell Steve whom you discussed your review with. Since he is so harsh with you, it would only impugn those people by association -- why does he want that info? It seems he would use (or at least hold) it against us. So I absolutely don't want him to know I am among those people.

I don't know what you should tell him -- just that the person/people involved felt that it would be used against them? Or more simply, they felt uncomfortable with that request?

Maybe you could say something like, "The conversations I had with (some of) my coworkers were private, and they feel it would be an invasion of their privacy

for me to reveal their names just because they talked with me. I'm sorry I can't reveal anyone's name."	
You could add something reassuring, if you can think of anything. Something to let him know you are not planning or inciting a rebellion among the staff	
2. I don't know what would be the best way to respond to Benka. There is fear of retribution.	
You can tell him that I'm appalled by his deviousness, that I consider you to be an extremely supportive and valuable colleague, and that the long-standing morale problem at PT (which obviously did not originate with your appeal becoming known last year) will only get worse if he doesn't improve his attitude. Management's increasingly repressive policies will inevitably have negative consequences.	1
3. I recommend that you tell Benka nothing other than that, having discussed the matter with people you trust and respect, you have decided to tell him nothing more about any performance-review-related discussions you have had.	
I suggest you simply request that he cease harassing you with threats, demands, gag orders, trumped-up allegations, and ad hoc declarations of confidentiality. You could also be kind and offer to send him some easy-to-understand information on such topics as freedom of speech and the right of assembly.	
4. I don't think there is any reason you should be required to disclose conversations you might or might not have had with other people in the building. With whom you discuss your business is your businessthe demand seems high-handed.	
As far as the review's confidentiality is concerned, I believe that it is, but as a restriction on the management, not on you.	
Jeff	
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Juno e-mail printed Mon, 6 Nov 2000 16:08:39, page 1

From: Toni Feder <tfeder@wam.umd.edu>

Received: from mx2.jersey.juno.com (mx2.jersey.juno.com [209.67.34.54])

by m4.jersey.juno.com with SMTP id AAA56D8F5AHQ398J for <jeff-schmidt@juno.com> (sender <tfeder@wam.umd.edu>);

Mon, 23 Aug 1999 21:43:23 -0400 (EST)

Received: from mx2.boston.juno.com (mx2.boston.juno.com [205.231.100.52])

by mx2.jersey.juno.com with SMTP id AAA56D8F5AEVZ78J for <jeff-schmidt@juno.com> (sender <tfeder@wam.umd.edu>);

Mon, 23 Aug 1999 21:43:23 -0400 (EST)

Received: from wilson.acpub.duke.edu (wilson.acpub.duke.edu [152.3.233.69])

by mx2.boston.juno.com with SMTP id AAA56D8F4A5JXAU2

(sender <tfeder@wam.umd.edu>);

Mon, 23 Aug 1999 21:43:22 -0400 (EST)

Received: from wam.umd.edu (async249-13.async.duke.edu [152.3.249.13])

by wilson.acpub.duke.edu (8.8.5/Duke-4.6.0) with ESMTP id VAA01658;

Mon, 23 Aug 1999 21:43:16 -0400 (EDT)

Return-path: <tfeder@wam.umd.edu> Reply-To: tfeder@wam.umd.edu

To: Jeff Schmidt <jeff-schmidt@juno.com>Cc: jak@interport.net, lugenbold@juno.com
Date: Mon, 23 Aug 1999 21:47:11 -0400

Subject: Re: Naming names

Message-ID: <37C1F95A.E7D97018@wam.umd.edu>

References: <19990823.050304.14375.0.jeff-schmidt@juno.com>

X-Status: Replied

X-Mailer: Mozilla 4.04 (Macintosh; I; PPC)

****** Please do not quote from the new content of this note. Some are

embedded in your text. ******

Hi Jeff,

I would feel more comfortable -- and think it would be a better strategy -- if you would summarize what your colleagues' reactions were to the request that you identify them, rather than read (as you say you would do after he says "yes" he'd like to know their reasons), or even repeat to him modified-verbatim what we each said. Reading identity-edited-out comments is theatrical. I think his request should be played down, not up, and nipped in the bud. I would prefer that (if anything at all) you say each idea once, in your own words, rather than in ours. For example, there is considerable overlap, in particular in the comments by me, Warren and Paul, so I suggest summing these up. Giving him three versions is an invitation for him to continue playing this stupid game of trying to identify your colleagues. In my view, the point to make is simple: it's none of his business. Jean made some different comments, and those may be worth including in whatever you say. (It would be fine with me if you noted that more than one colleague commented that they think of you as a very valuable colleague, and value your contributions to the magazine.) But I prefer the simpler, less theatrical tack of paraphrasing and summing up, rather than "handing him our words."

In that vein, my preference would be that you still ask him (if you want to) why he wants to identify the colleagues who know about your review, and then say (something like) they (and I) all feel that it's not appropriate to have to report on private conversations. One person noted that confidentiality is a restriction on management, not on employees.

end of investigation, let's hope.
--- Toni

Subject: Naming names Date: Mon, 23 Aug 1999 05:00:46 EDT From: Jeff Schmidt <jeff-schmidt@juno.com> To: jak@interport.net, lugenbold@juno.com, tfeder@wam.umd.edu CC: jeff-schmidt@juno.com

Dear four colleagues who saw my annual review and who Benka wants me to name,

Taking everyone's suggestions into account, my current thinking is to not give Benka any names and to not give him anything in writing. I would give him a verbal report that would include the four responses (below) to his demand. Even though I have removed your name, I won't include your response in my oral report without your approval. So please find it below and let me know if it is ok; modify it if necessary.

As one of you suggested (and as I had decided, too), I would first ask Benka why he wants the names. To him, I think, the problem isn't the out-to-get-you review; it's the fact that I disclosed it and criticized it. [JEFF: SO WHAT DO YOU THINK HIS MOTIVE IS, IF NOT TO SOMEHOW HOLD IT AGAINST YOUR COLLEAGUE-CONFIDANTS?] If he comes around asking, "Did Jeff talk to you about his performance review?", feel free to say "yes" or "I don't feel comfortable reporting on private conversations" or "I don't feel comfortable reporting on private conversations, but I am familiar with the review and can talk about that." I'd probably be better off if you didn't say who showed you the review, and if you didn't say that you saw any written response to it. [IF HE ASKS ME, I PLAN TO SAY I THINK IT'S NONE OF HIS BUSINESS. BUT I DON'T SEE ANYWAY OF HOLDING THAT PARTICULAR DISCUSSION, AND I HOPE HE DOESN'T ASK]

My spoken report to Benka would be something like this:

Following up on your request, I was able to track down four colleagues who saw my annual review either because I showed it to them or because someone else did. They all reacted negatively to your request for their names, so I'm afraid I don't have any names to report. The most I can do is tell you what they told me when I asked for permission to identify them. Would that be of any use to you? [At this point Benka says yes and I read the following responses.]

[AS I WROTE ABOVE, I PREFER YOU PARAPHRASE, RATHER THAN READ MY RESPONSE]

1. Obviously I don't think you should tell Steve whom you discussed your review with. Since he is so harsh with you, it would only impugn those people by association -- why does he want that info? It seems he would use (or at least hold) it against us. So I absolutely don't want him to know I am among those people.

I don't know what you should tell him -- just that the person/people involved felt that it would be used against them? Or more simply, they felt uncomfortable with that request?

Maybe you could say something like, "The conversations I had with (some of) my coworkers were private, and they feel it would be an invasion of their privacy

for me to reveal their names just because they talked with me. I'm sorry I can't reveal anyone's name."
You could add something reassuring, if you can think of anything. Something to let him know you are not planning or inciting a rebellion among the staff
2. I don't know what would be the best way to respond to Benka. There is fear of retribution.
You can tell him that I'm appalled by his deviousness, that I consider you to be an extremely supportive and valuable colleague, and that the long-standing morale problem at PT (which obviously did not originate with your appeal becoming known last year) will only get worse if he doesn't improve his attitude. Management's increasingly repressive policies will inevitably have negative consequences.
3. I recommend that you tell Benka nothing other than that, having discussed the matter with people you trust and respect, you have decided to tell him nothing more about any performance-review-related discussions you have had.
I suggest you simply request that he cease harassing you with threats, demands, gag orders, trumped-up allegations, and ad hoc declarations of confidentiality. You could also be kind and offer to send him some easy-to-understand information on such topics as freedom of speech and the right of assembly.
4. I don't think there is any reason you should be required to disclose conversations you might or might not have had with other people in the building. With whom you discuss your business is your businessthe demand seems high-handed.
[I DO THINK IT'S A GOOD IDEA TO MENTION THE FOLLOWING COMMENT BY WARREN As far as the review's confidentiality is concerned, I believe that it is, but as a restriction on the management, not on you.
Jeff
Get the
Internet just the way you want it. Free software, free e-mail, and free Internet access for a month! Try Juno Web: http://dl.www.juno.com/dynoget/tagj.

Juno e-mail printed Mon, 6 Nov 2000 16:08:39, page 3

Juno e-mail printed Mon, 6 Nov 2000 16:13:12, page 1

From: Toni Feder <tfeder@wam.umd.edu>

Received: from mx2.jersey.juno.com (mx2.jersey.juno.com [209.67.34.54]) by m4.jersey.juno.com with SMTP id AAA56EBYDAWVD5QS for <jeff-schmidt@juno.com> (sender <tfeder@wam.umd.edu>);

Mon, 23 Aug 1999 22:43:15 -0400 (EST)

Received: from mx5.boston.juno.com (mx5.boston.juno.com [205.231.100.53]) by mx2.jersey.juno.com with SMTP id AAA56EBYDAUBEXCJ for <jeff-schmidt@juno.com> (sender <tfeder@wam.umd.edu>); Mon, 23 Aug 1999 22:43:15 -0400 (EST)

Received: from wilson.acpub.duke.edu (wilson.acpub.duke.edu [152.3.233.69]) by mx5.boston.juno.com with SMTP id AAA56EBYDAMGG9P2 (sender <tfeder@wam.umd.edu>);

Mon, 23 Aug 1999 22:43:15 -0400 (EST)

Received: from wam.umd.edu (async249-8.async.duke.edu [152.3.249.8]) by wilson.acpub.duke.edu (8.8.5/Duke-4.6.0) with ESMTP id WAA02639; Mon, 23 Aug 1999 22:43:11 -0400 (EDT)

Return-path: <tfeder@wam.umd.edu> Reply-To: tfeder@wam.umd.edu

To: Jeff Schmidt <jeff-schmidt@juno.com> Co: lugenbold@juno.com, jak@interport.net Date: Mon, 23 Aug 1999 22:47:12 -0400

Subject: Re: Naming names

Message-ID: <37C20767.2DBF0F6A@wam.umd.edu>

References: <19990823.050304.14375.0.jeff-schmidt@juno.com>

X-Status: Read

X-Mailer: Mozilla 4.04 (Macintosh; I; PPC)

hi again, jeff,

this is an addendum to my previous e-mail. i'm glad you will summarize rather than read our comments. the reason for writing now is just to offer support-because from your note i realize that you worry he would try to collect data about you from us (i.e. use our names against your, unsuccessfully, i'd bet), whereas i'm thinking he'd use the information to penalize us. irony. well, let's not let him use any of it against any of us.

toni

Message to my supervisor in which I express the fear that he will "kill the messenger" (me) for standing up on behalf of staff members for the staff's right to have private conversations about workplace issues

30 August 1999

Steve --

Here are the notes that you requested. They outline the responses that I got when I asked colleagues who saw my annual review for permission to fulfill your request that I report their names to you. As you know, I did not want to give you this written report, but you insisted that I do so. I can only hope that you will use it to address staff concerns and not "kill the messenger."

Four themes were apparent in the responses from my coworkers.

- 1. They consider me to be a supportive and valuable colleague, and they want you to behave in accord with that view. They note that the long-standing staff morale problems did not originate with my review appeal.
- 2. Their anxiety was exacerbated by the fact that you were not open about your reasons for wanting their names. (Later, when I asked you specifically why you wanted their names, you refused to answer.) Thus the only thing they imagined coming from your investigation was punishment, of me or of them. They think they would be subject to guilt by association, because you have been so harsh with me.
- 3. They feel that their conversations were private and that to reveal them would be an invasion of their privacy. They made reference to the First Amendment, the spirit of which they evidently carry with them.
- 4. They agree with you that annual reviews are confidential, but they see that as a restriction on management, not on them. Thus they feel free to discuss their reviews, and many do. They think it would set a bad precedent if any of us were punished for that.

Please let me know if I can be of further assistance.

Jeff

Rec'd from Steve Benke, 28 Aug. 99.

Notes: #of pages[editor's initials, day closed ("minus" is good)]article author

1997

January

71/2[JS-2]Collins, 61/2[JS-6]Weart

February

7[JS-1]Wheelon

March

-----REVIEW PERIOD ------6[JS-7]Sales

April

7[JS-1]Ferguson, 71/2[JS-1]Crabtree

May

June

71/2[JS-4]Crowley, 61/2[JS-2]North

July

5[JS-2]Parsegian, 7[JS-5]Harris

August 61/2[JS-4]Soulen

September

6[JS-9]Libicki

October

7[JS-5]Perl

November

December

6[JS-7]Ross, 6[JS-7]Riordan

1998

January

7[JS-0]Mourou

February

-----REVIEW PERIOD ----(18 articles required)-----6[JS-0]Sullivan, 6[JS-0]Barth,

{5[JS-8]GoldsteinI, counted in previous

review period}

April

March

6[JS-0]Ramaty,

{5[JS-8]GoldsteinII, counted in previous review period}

May

6[JS-2]Dekee

June

61/2[JS-2]Busch-Vishniac

July August

6½[JS-7]Segev, 7[JS-1]Hemley

September

October

61/2[JS-8]Bering, 61/2[JS-1]Canfield

8x5decades=40[all+3] Jeff gets 1/2 credit for one decade

November

5.5[JS-3]Vogel

December

1999

January

6.5[JS-1]Redish, 6.5[JS-8]Ertl

February

September

6[JS-7]Bernholc

-----REVIEW PERIOD ------

October

Will

Agreement that I worked out with the American Institute of Physics specifying how much work I will do and how much I will be paid in return for doing that work

PHYSICS TODAY MEMO

TO:

Jeff Schmidt

FROM:

Steve Benka

SUBJECT:

Part-time status

DATE: 14 September 1999

CC: James Stith, Terri Braun

You have requested a change in employment status from full-time to part-time. In your part-time capacity, you would perform two-thirds of your workload for *Physics Today*. You would complete 12 rather than 18 articles per year and be paid two-thirds of your full-time salary. Per AIP's HR policies, as a regular part-time employee working at least 25 hours per week, you will keep all of your employee benefits.

This arrangement is subject to periodic review; your status can be changed back to full-time, should management determine that your part-time status has an adverse impact on the magazine.

Your part-time status is effective as of 20 September 1999.

Approved:

J. Stith

9/17/99

Signed by James H. Stith, a director of the American Institute of Physics

Praise for my work from
Future presidential science advisor
Nobel prize laureates
Prominent physicists
Editor of Physics Today (my supervisor)
Executive Director and CEO of American Institute of Physics

A STRUCTURE BONNAL HOWARD

Yale University

A. W. Wright Nuclear Structure Laboratory

272 Whitney Avenue, P.O. Box 6666, New Haven, Connecticut 06511

D. Allan Bromley Henry Ford II Professor and Director 203-436-3026 SEP 6 N.C. PHYSICS TODAY.

west he yes then

August 24, 1983

Dr. Harold Davis, Editor PHYSICS TODAY American Institute of Physics 333 East 45th Street New York, New York 10017

Dear Hal:

As you know, I maintain concern that nuclear physics gets adequate coverage in Physics Today. I write at this time to bring to your attention the possibility that two of my former colleagues, Robert J. Ascuitto and Ernest J. Seglie, might be invited to prepare a paper on Grazing Collisions of Atomic Nuclei for publication in your journal. I have talked with them about this, and at my request, they have prepared a very general sort of talking outline which I enclose. It actually seems to me that this particular outline is much more appropriate for Scientific American than for Physics Today, but Bob and Ernie are the two guys who, perhaps more than anyone else, contributed to our understanding of these collisons and what they can tell us about the underlying dynamics and structure of nuclei. They can write a very elegant article for you. Since it turns out that both of them have won very significant awards for excellence in teaching and clarity in writing, and I think that you and your people would enjoy working with them.

Although both are excellent nuclear physicists, Bob Ascuitto is presently completing his residency in pediatrics at the University of Connecticut Medical Center, and Ernie Seglie is a senior staff officer at the Institute for Defense Analysis in Washington. Together, they were members of the Physics Department here at Yale for a number of years. In Bob Ascuitto's case, I made the mistake, as Chairman of the Department, of assigning him to teach medical physics to undergraduates. He became so intrigued by this that he decided to undertake a medical program at our medical school in parallel with his duties as an Associate Professor of Physics. Not only did he score at the top of his entire class but also during his last year of the program, he generated five Physical Review Letters which is no mean feat for someone working full-time at physics. In short, he is a very unusual individual.

He and Seglie have worked together for many years and have just completed a major chapter for me as part of a treatise on heavy ion science that Plenum Press is publishing. It will be the definitive work on these grazing collisions for a great many years to come, and it is on that basis that I feel quite confident in recommending them to you for a Physics Today article.

I am contacting you at their request and have told them that I have forwarded the outline to you. If you have some interest in this, just drop me a note or give me a call at 203-436-3026 and I will put you in touch with the two of them directly.

In the meantime I must tell you that Jeff Schmidt did an absolutely outstanding job in editing the paper I had prepared on Neutrons in Science and Technology for presentation at the 40th Anniversary of Fermi's First Reactor at the University of Chicago. I made no changes whatsoever in what he had done. You really do not know how unusual that is because, almost inevitably, I end up having giant hassles with editors who work over my papers. Let me then put in a very strong plug for Jeff.

With warmest personal regards.

Sincerely yours,

allan

(mrs)

D. Allan Bromley

DAB:lal

Became the president's

science advisor

University of Illinois at Urbana-Champaign

College of Engineering
MATERIALS RESEARCH LABORATORY
104 S. Goodwin Ave.
Urbana, Illinois 61801
(217) 333-1370

May 14, 1982

Dr. Tom von Foerster PHYSICS TODAY 335 East 45th Street New York, New York 10017

Dear Tom:

After sampling my approximate need, I would like to order 500 reprints of my PHYSICS TODAY article entitled, "Thermodynamics of Excitons in Semiconductors." This would include black-and-white article with four-color cover. Since the article is 8-1/3 pages, I estimate from your guideline sheet that the charge would be $$110 + 4 \times $17 = 178 plus cover at $$230 + 2 \times $26 = 282 for about \$460 total cost, plus some cost for 200 covers you now have. If this estimate is far off, let me know; otherwise, please initiate the order.

I am very pleased with the final product. The cover photo reproduced very well and the article and figures came out nicely. I was pleased with the interest and knowledgeability of Jeff Schmidt, whose thorough reading of the manuscript and interest in the material helped to make the article more readable. Thanks.

Sincerely,

Jim Wolfe Professor of Physics

JW:dj

RECEIVED

MAY 2 1 1982

PHYSICS TODAY

May 14, 1984

Jeff Schmidt Associate Editor Physics Today 335 East 45 Street New York, NY 10017

Dear Jeff:

With reference to your letter of May 9 and my telephone reply, I want to put in writing how very grateful I am for the superb editing job that you did on our article on atomic physics with synchrotron radiation. I wish I could write like that!

Will it be possible to order a few reprints, or extra copies of the June issue?

With best regards,

Sincerely,

Bernd Crasemann Professor of Physics

BC:sh



The University of Wisconsin - Milwaukee

LABORATORY FOR SURFACE STUDIES DIRECTOR: David S. Y. Tong

MILWAUKEE, WISCONSIN 53201 PHONE: (414) 963-5765, 4474

October 29, 1984

Dr. Harold L. Davis, Editor Physics Today 335 East 45th Street New York, NY 10017

Dear Harold:

Just a note to let you know that since the publication of my article, "Exploring Surface Structure" in Physics Today, I have received many responses. Most of the responses are from people that I have never met. This indicates how popular your journal is. One response characterized Physics Today as a "widely read and influential" journal.

I would like to take this opportunity to thank you for asking me to write the article. Also, I would like to thank Jeffrey Schmidt for his excellent editing work.

On the other hand, some comments from colleagues complain that their names or work were left out of the article. Incidentally, most of the complaints came from West Germany (I do not know the significance of this). I remember the difficult hours Jeffrey and I spent on cutting out names and paragraphs from the original draft. However, it is difficult to convince a colleague that a non-expert cannot care less for a name. They point out that department chairmen and industrial managers read these articles to judge the performance of their staff.

Surface structure is an active and dynamic area. Of the 26 surface techniques that I discussed in the article, I feel many of them deserve full length articles in your journal. I would support such future articles to be written by various authors.

Finally, I have ordered reprints and complimentary copies but have not yet received them. Could someone check on this for me please?

With best regards,

Yours sincerely,

S. Y. Tong RECEIVED

SYT:da



THE UNIVERSITY OF ARIZONA

TUCSON, ARIZONA 85721

602/621-6970 LUNAR AND PLANETARY LABORATORY

February 22, 1985

Mr. Jeff Schmidt, Assoc. Editor PHYSICS TODAY 335 E. 45th St. New York, NY 10017

Dear Jeff:

With this letter I thank you for your help with the article on asteroids and comets in the February issue. I have had much editing experience myself, for the Space Science Series books of the University of Arizona Press, and it is through this training that I can appreciate the exceptional job you have done.

There was a considerable amount of rewriting that you guided me into patiently and the article is much better than my original version. Your thinking through the material and your questions step by step have actually clarified the material for me; where I had made a statement carelessly you would bring me up and bring about a clearer version.

I also admire your patience. Until the very end, with the material already set, I kept asking you for additions and changes because the field is changing so fast. You allowed all of these and I am most grateful.

If you ever want to move out West, we would love to have you at the Press and we could surely use your competence.

With best regards,

Tom Gehrels

TG/sm

cc: Dr. H. L. Davis

P.S. Would you have a few reprints of the article or a few February issues for me? As we discussed on the phone, I would now like to send this to the Soviet Union where there is an interest in publishing a translated version of the article.

RÉPUBLIQUE FRANÇAISE



COMMISSARIAT A L'ÉNERGIE ATOMIQUE

SERVICE DE PHYSIQUE DU SOLIDE ET DE RÉSONANCE MAGNÉTIQUE ORME DES MERISIERS - 91191 GIF-SUR-YVETTE CEDEX FRANCE

TÉLEX : ÉNERGAT SACLAY 690641 F

5 March 1986

Dear alone,

I was very pleased that my article was accepted for Physics Today without any major remains. I enjoyed interacting with Jeff Schnidt, and felt that he significantly improved the quality of the manuscript. I tak forward & seeing the March Issue.

With best wishes,

RECEIVED

MAR 1 2.1985

PHYSICS TODAY.

Yours sincerely,

John Clarke

BERKELEY * DAVIS * IRVINE * LOS ANGELES * RIVERSIDE * SAN DIEGO * SAN FRANCISCO



SANTA BARBARA • SANTA CRUZ

DEPARTMENT OF PHYSICS, B-019 LA JOLLA, CALIFORNIA 92093

April 14, 1986

Ms. Gloria B. Lubkin, EdRtErC EIVED

Physics Today

335 East 45 Street APR 2.1 1983

New York, N. Y. 10017 PHYSICS TODAY

Dear Gloria,

It is unfortunate that our paths didn't cross during the March APS meeting in Las Vegas, Hopefully, I will have another opportunity to see you some time in the near future.

I am writing to thank you for inviting me to contribute the article "Novel Types of Superconductivity in f-Electron Systems" for Physics Today. I am very pleased with the way the article turned out, and I enjoyed working with you and Jeff Schmidt on it. I had the opportunity to meet Jeff in Las Vegas, to tell him how much I liked the article, and to thank him for his considerable effort he put into its preparation.

With best regards,

Sincerely,

M. Brian Maple

MBM:njm



Stockholm, September 29, 1986

Department of Plasma Physics

Dr Gloria Lubkin Physics Today 335 East 45 Street New York, N.Y. 10017 USA

Dear Dr Lubkin,

I wish to thank you for the very nice presentation which Physics Today has given my paper "Plasma Universe". I believe that your publication will mean a breakthrough for the general understanding of plasma phenomena in astrophpysics and the acceptance of ideas for which I have fought for more than 40 years.

Please convey my appreciation to Dr. Jeffrey D. Schmidt, with whom I have had a number of fruitful telephone conversations.

Yours sincerly,

Hames Allven

Hannes Alfvén Nobel laureate

RECEIVED

OCT U ISC

PHYSICS TODAY

377 FILE: NAGLE

REV: ELLS;12/03,08:41 BY: J;25/02,12:10

12-MAR-87 09:24:14

QUEUE:TYP-OUT

11 March 1987, 3:30 pm.

This article has three tables.

Dr. Darragh Nagle and Dr. Mikkel

Los Alamos National Laboratory

Mail stop H864

Los Alamos, New Mexico 87545

505-667-2971 (Nagle)

505-667-6942 (Johnson)

Dr. David Measday

Physics Department

University of British Columbia

6224 Agriculture Road

Vancouver, BC

Canada V6T 2A6

604-228-5098 (Measday)

604-228-3853 (physics department)

QUEENS COLLEGE

OF THE CITY UNIVERSITY OF NEW YORK

FLUSHING . NEW YORK 11367-0904

DEPARTMENT OF PHYSICS

TELEPHONE: 718-520-5000

March 31, 1987

Dr. Jeffrey Schmidt PHYSICS TODAY 335 E. 45th Street New York. NY 10017

Dear Jeff:

I want to thank you for your extraordinary efforts in ferreting out eye-grabbing photos of vehicle accidents. In fact, they captured my attention to the extent that I read the article yet again.

I think every aspect, the photos, layout, color, length, etc., have made a balanced and easily readable article. You have done a fine job of editing and I and my colleagues appreciate it.

Sincerely,

Arthur C. Damask

Professor

ACD:sa



Russell J. Donnelly Professor of Physics (503) 686-4226

May 5, 1987

Dr. Gloria Lubkin, Editor Physics Today 140 East 45th Street 37th Floor New York, NY 10017

Dear Gloria:

Now that my parts of the February and April <u>Physics Today</u> are published I want to thank you very much for making it all possible.

First of all, I thank you on behalf of the low temperature community for the nice series of articles on ³He and ⁴He. It was nice to think of being part of the good <u>old</u> low temperature community. Who the heck would have thought that by April superconductivity would be headed for temperatures created by ice and salt? I wonder what our friends will call themselves now?

I was also pleased by all the telephone calls on the Dana article. Not the least surprise was to find that Leo Dana is the person who got Dave Lazarus interested in science.

I would especially like to thank Jeff Schmidt, who worked closely and thoughtfully with me to make it all become real.

Yours sincerely,

Rumil

Russell J. Donnelly

RJD:mcr 0401C From Executive Director and CEO of the American Institute of Physics

AMERICAN INSTITUTE OF PHYSICS

335 EAST 45 STREET NEW YORK, NEW YORK 10017 * Telephone (212) 661-9404
Telex 960983 AMINSTPHYS.NYK

KENNETH W. FORD

Executive Director and CEO

28 October 1987

To:

Gloria Lubkin

From:

Kenneth W. Ford

Subject:

Canavan - Bloembergen-Patel debate

I edited it .

Congratulations to you and your staff on a superb job of presenting the Canavan vs. Bloembergen and Patel material. It is very effective and much more readable than standard "debate" formats. The PT lead-ins help too. I am very impressed by the job you have done.

KWF: lab

cc: John Rigden

DCT 1987
RECEIVED
Physics
Today

UNIVERSITY OF TOKYO

7-3-1 HONGO, BUNKYO-KU, TOKYO 113, JAPAN

FACULTY OF SCIENCE
DEPARTMENT OF PHYSICS

TELEPHONE: 03-812-2111 CABLE: TOKUNIV RIGAKU TELEX: UTPHYSIC J23472



13 November 1987

Dr. Gloria B. Lubkin Editor, Physics Today American Institute of Physics 335 East 45th Street New York, NY 10017 U.S.A.

Dear Dr. Lubkin,

Thank you very much for your letter of November 6.

It was a great pleasure to meet you and to talk with you in Washington.

I received the edited version of my manuscript. I was very happy to see the beautifully edited version of my article.

I am now herewith sending you back a copy right form which you requested to fill out.

Many thanks again for inviting me to write an article in Physics Today. I hope to see you again in the near future.

Yours sincerely,

Hiroshi Kamimura



A Century of Excellence / 1887-1987

March 10, 1988

Ms. Gloria B. Lubkin, Editor Physics Today 335 East 45th Street New York, New York 10017

Dear Ms. Lubkin:

I acknowledge with thanks the receipt of your letter of March 7, 1988, informing me about the acceptance of my manuscript for publication in <u>Physics Today</u> (April issue). I am herewith enclosing the copyright form duly signed.

I take this opportunity to thank you and your associates, especially Jeff Schmidt, for bringing this project to a successful ending. It has been a very rewarding experience for me and I have very much enjoyed working with Jeff Schmidt.

Sincerely,

Vijendra K. Agarwal Associate Professor

Department of Physics and Astronomy

VJK/lt enclosure



mai price.

Giorgio Margaritondo

Bitnet: Giorgio@Wiscpsl

Synchrotron Radiation Center University of Wisconsin-Madison

3731 Schneider Drive Stoughton, WI 53589-3097 - Phone (608) 873-6651

1988 April 21

Dr. Gloria Lubkin Editor, Physics Today 335 East 45th Street New York, NY 10017

RE: My article in Physics Today (April 1988)

Dear Gloria:

Now that my article has been published, I would like to thank you for giving me this opportunity to celebrate the 100th anniversary of Hertz's discovery. As usual, your staff has done an outstanding job in transforming my English-Italian into an impeccable text that Hemingway would not have minded to sign — and my poor pictures into super-sharp figures.

Would you please extend my thanks to the staff that was involved in the production of the article.

With my best regards.

Sincerely,

Giorgio Margaritondo

Associate Director for Research

GM:tlm

Dich appreciation for considerable editorie

Jerome Karle

MACROMOLECULAR STRUCTURE FROM ANOMALOUS DISPERSION

Jerome Karle Nobel prize laureate



MASSACHUSETTS INSTITUTE OF TECHNOLOGY

DEPARTMENT OF PHYSICS

77 MASSACHUSETTS AVENUE CAMBRIDGE, MASSACHUSETTS 02139

Robert J. Birgeneau

Head of the Department of Physics Cecil and Ida Green Professor Of Physics Room 6-113 (617) 253-4801 Telefax (617) 253-8554

July 19, 1989

Dr. Gloria B. Lubkin Editor, Physics Today 335 East 45 St. New York, NY 10017

Dear Gloria,

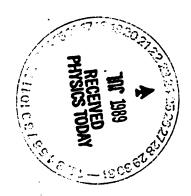
As you realize, our Liquid Crystal article finally appeared in Physics Today and it looks beautiful! I feel obligated to confess to you that you were quite correct in insisting that we simplify the original manuscript. Joel Brock and I have already gotten many compliments on the article - compliments we undoubtedly would not have received for the original version which was too technical. You should also congratulate Jeff Schmidt on a fine editing job. He was a pleasure to work with and he made a number of excellent stylistic improvements.

Best regards!

Yours sincerely,

Robert J. Birgeneau

RJB/km



From Russian physicist

RCA SEP 21 8238# Aminstphys nyk

411059 CERII SU

GLORIA B LUBKIN EDITOR PHYICS TODAY 335 EAST ASTH STREET NEW YORK N Y 10017 U S A

FAVORABLE, DNE CRITICAL AND SEVERAL CRAZY. HOW MANY LETTERS HAVE THANK YOU FOR PROVIDING FREE OFFFRINTS. I HAVE ALREADY RECEIVED MOST OF THEM ARE YOU RECEIVED IN CONNECTION WITH MY ARTICLE? ABOUT TWENTY RESPONCES ON ENERGY AND MASS. DEAR GLORIA,

ARE PLEASED TO ENCLOSE A COMPLIMENTARY I HAVE THE MOST WARM RECOLLECTIONS FROM BY VISIT TO YOUR BLT THE COPY ITSELF DID NOT ARRIVE. JOFFREY SCHMIDT FOR THIS I HAVE ALSO RECEIVED A LETTER FROM PETER G. BROWN SAYING . . WE COFY OF DUR JUNE 189UE". CFF 1CE.

WITH CORDIAL WISHES, LEV CKUN

-Ç1

CENTACTERYS NYK

411059 CERII SU

From famous Physicist Blegdamsvej 17, DK-2100 København Ø KØBENHAVNS UNIVERSITET Telefon: 01 42 16 16 Abraham Pais (Einstein's **NIELS BOHR INSTITUTET** Telegram: PHYSICUM, København ACl Jan 15 biographer) Telex: 15216 nbi dk December 14 89 De as 6 loria Thavefust received a I edited it. Today Towart you to know how rey pleased Dany with the way my pièce has comeant. Please tell that also to all those others who I am frest back from beckir but very floasant days in Itschholm worked ouit. Where Ida and) attended the Nobel circus Cam's freetrys

CALIFORNIA INSTITUTE OF TECHNOLOGY

Arthur Amos Noyes Laboratory of Chemical Physics, Mail Code 127-72
Pasadena, California 91125

AHMED H. ZEWAIL

Linus Pauling Professor of Chemical Physics HAY 1990
RECEIVED TODAY
PHYSICS TODAY

Telephone: (818) 356-6536 Telex: 675425 CALTECH PSD . FAX: 818-792-8456

May 9, 1990

Dr. Gloria Lubkin Editor Physics Today 140 E. 45th Street (37th Floor) New York, New York 10017

Dear Dr. Lubkin:

This letter is regarding the Physics Today special issue on Dynamics of Molecular Systems. As you know, I was one of the authors of the special issue, and I interacted with Jeff Schmidt in the process of producing our article. I wanted you to know that Jeff has made very important suggestions, and I really do appreciate his genuine interest in producing high quality articles. He is excellent and Physics Today is lucky to have him.

I was delighted to write the article, and I hope that this special issue will be of interest to your readers.

Sincerely yours

Ahmed H. Zewail

AHZ:lm



Department of Nuclear Engineering and Engineering Physics

University of Wisconsin

153 Engineering Research Building 1500 Johnson Drive Madison WI 53706-1687 Phone (608) 263-1646

January 3, 1992

Professor James D. Callen 521 Engineering Research Building 1500 Johnson Drive Madison, WI 53706-1687 Phone (608) 262-1370 FAX (608) 262-6707 CALLEN@UWM

Gloria B. Lubkin, Editor Physics Today 335 East 45th Street, 37th floor New York, NY 10017

Dear Gloria:

As you are undoubtedly aware by now, we have finally completed the two articles on "Progress Toward a Tokamak Fusion Reactor" and "Stability and Transport Processes in Tokamak Plasmas," which will be published in your January issue. I apologize for its taking so long for us to complete them — it took me being on sabbatical this year to have enough time to finally get them completed, even with Rob Goldston ultimately assuming the lead role on the first article. I appreciate your forbearance with our delayed schedule. We are especially pleased that both articles are being published in a single issue with a picture of TFTR on the cover since we now realize how unlikely that situation is under normal circumstances. Finally, I would like to note how helpful your technical editors, Jeff Schmidt and Graham Collins, have been in polishing up these articles and making them much more understandable to the physics community beyond plasma physics. In particular, I learned a lot about simplicity and precision in technical writing from Jeff Schmidt's careful, patient technical editing of my manuscript and my numerous clarifying discussions with him. This experience should be quite helpful to me in my present project — writing a graduate level textbook on plasma physics.

With regard to the free copies of the January issue and offprints which, according to your letter of 22 November, you will be providing for each article, could you please send all of them (total of 6 magazine copies plus 100 + 100 offprints) to me at my University of Wisconsin address. I will take care of distributing them equitably to the six coauthors of the two articles in this cooperative venture. For your reference, we are also ordering through the AIP 600 copies of a special offprint package comprised of the cover and the two articles.

As this saga draws to a close, I wish you the best of luck in dealing with authors and acquiring manuscripts from them in a timely manner — to get them into a magazine that has to be balanced and timely, but in any case must go out monthly. It must be a nerve-wracking job. Best wishes for continued success at it.

Sincerely, Zames & Callen

James D. Callen

Kerst Professor of Nuclear Engineering & Engineering Physics and Physics

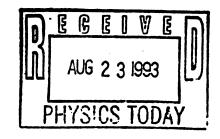
JDC:blg cc: J. Schmidt



West Virginia University

College of Arts and Sciences

20 August 1993



Dr. Gloria B. Lubkin Editor
Physics Today
335 East 45th Street
New York, NY 10017

Dear Dr. Lubkin:

Thanks for yours of 4 August inviting Rick Slavings and myself to contribute a paper on "The Industrialization of American Astronomy, 1890-1940." We accept with great pleasure.

There is, however, one problem. My wife has been offered a deanship at University of Nebraska-Lincoln and the powers that be are working on a professorship for me. This process is still in an early stage, but may consume a fair amount of my attention and energy this fall. If the matter has a happy ending (and Nebraska would be a good venue for both of us), the new jobs will begin 1 January 1994. This entails moving. Of course, with the prospect of moving to College Park facing you and the PT staff, I need hardly say that even in the best of organizations, there will be some disruption and slippage. Thus I am not able to give you an exact date for delivery of a manuscript. I will do so just as soon as things become clear on this end. Late winter 1994 will be my goal. Earlier if possible.

I have been reading on the topic of Big Science and want to recast the paper as follows. The new title would be something like: THE MAKING OF BIG SCIENCE: THE INDUSTRIALIZATION OF AMERICAN ASTRONOMY, 1880-1940. And we would begin with a paragraph placing the problem in the context of the history of big science. This will be done with appropriate references to physics as the exemplar of Big Science. The literature suggests that a major problem is understanding the pre-1940 roots of Big Science in America and this paper will be aimed at that problem. If all goes well, I will us this problem as the topic for my seminar at Nebraska when I go to interview. A little pre-testing feed back is always useful.

I hope that Jeff Schmidt will be assigned to work with me once you have the manuscript. He is first-rate and we worked very well together on the 1990 paper.

// *//*

Sincerely.

John Lankford

Professor of the History of Science

From founous physicist Abraham Pais (Einstein's biographer)

KØBENHAVNS UNIVERSITET

NIELS BOHR INSTITUTET

Blegdamsvej 17, DK-2100 Kebenhavn Ø PHONE: (+45) 3532 5200 PHONE, direct (+45) 353 25
TELEFAX, national: (31) 42 10 16
TELEFAX, internat: +45 31 42 10 16

TELEFAX

to: Mileff Schnidt
1001-301-200842
Telefax no.: 6/11/0V
date:
Ref.:
Dear Mr. Schmidt. Attached please
find corrections to my piecefor Ph. Today
and corrections to to
I complement you on your editing -
10 1 (: A Lichael
and onyour excellent a horizof pictures
Perhaps it is too early to ash:
Constant land Mair
1 How many free offints
D How many can dorde ? Price?
I'd like them all with cover
Please contact if there are fuller
que hais. Best rejacos asto Gloria Roma Far
Clara
6 corra Ray

University of Illinois at Urbana-Champaign

Department of Physics

Loomis Laboratory of Physics 1110 W. Green Street Urbana, Illinois 61801 James P. Wolfe

Telephone: (217) 333-2374 Telefax: (217) 244-2278 E-Mail: j-wolfe@uiuc.edu

Jeff, FYI



September 8, 1995

Stephen Benka, Editor Physics Today One Physics Ellipse College Park MD 20740-3843

Dear Steve,

Many thanks to you and your staff for the excellent job you did with my article in the September 1995 issue of Physics Today. The graphics reproduced beautifully, and, of course, the cover is stunning. My interactions with Jeff Schmidt were very pleasant and constructive. The article benefitted greatly from your reviewers' suggestions; it is much better than the one I originally sent you.

The alliteration on the cover, "Seeing Sound in Solids," adds a nice touch. Thanks for inventing it. I will look forward to working with you again in the future.

Sincerely,

Jim Wolfe

Professor of Physics

८ ्र यद्याः

9 01. De. 7 University of Illinois at Urbana-Champaign

Department of Physics

Loomis Laboratory of Physics 1110 W. Green Street Urbana, Illinois 61801 James P. Wolfe

Telephone: (217) 333-2374 Telefax: (217) 244-2278 E-Mail: j-wolfe@uiuc.edu

October 20, 1995

Jeff Schmidt Physics Today One Physics Ellipse College Park MD 20740-3843

Dear Jeff,

Thanks for returning the graphics materials. It was a real pleasure working with you on the article. You and your staff did a terriffic job.

I recently received a phone call from one of the organizers of the Acoustical Society Meeting (November, St. Louis) with a request to submit some of the "stunning" photos in Physics Today to their first Gellery of Acoustics. It is exciting to publish an article which has appeal to experts as well as (hopefully) the general reader.

I will look forward to working with you in the future.

Sincerely,

Jim Wolfe

Professor of Physics

From member of Physics Today Advisory Committee

MASSACHUSETTS INSTITUTE OF TECHNOLOGY DEPARTMENT OF PHYSICS

DANIEL KLEPPNER
Lester Wolfe Professor of Physics

address: MIT room 26-237 Cambridge, MA 02139

phone: 617/253-6811 fax: 617/253-4876 4k@amo.mit.edu

November 22, 1995

Dr. Stephen G. Benka American Institute of Physics

Dear Steve.

I am sorry to be tardy in giving you feedback on PT, but let me start to catch up by commenting on the October issue. I will not comment on every item on your list, only on topics for which I have something to say.

General: the issue strikes me overall as strong. The cover is spectacular (though the title "sounding out the sun" is a trifle cutesy- particularly since one looks rather than listens), and the balance of articles is excellent- encompassing physics, geophysics, and biography.

PHYSICS UPDATE: interesting topics. However, the opening line "A silicon device for triggering a nerve cell has been constructed...." is pretty dull, as is invariably the case with the passive. The other reports have a zippier style. The AC suggested better graphical design for the page. One thought-develop a set of small logos-say for quantum mechanics, medical physics, materials, etc.- that would give a quick identification of the area while also adding visual interest. These could be small and placed in the margin. You might run a design contest to get suggestions from the readers. That could be done electronically. You would have to think carefully whether it is worth the effort, but it might drum up reader interest.

REFERENCE FRAME. Preachy.

LETTERS: The letter of Seaborg et al demolishes Gabbard's hypothesis, which raises the question of how Gabbard's letter got published in the first place. I haven't gone back to read it, but even Gabbard now disowns it. A more rigorous scientific review of his letter would have saved confusion. More seriously with respect to this column, the letters of Hayden, Ravnik and Cohen take up lots of space and do not add anything new. Your readers should not be led, as I was, to read a long correspondence and then find that most of it is simply overkill. In my opinion, PT should have published the Seaborg letter, a brief note to say that Hayden, Ravnik and Cohen had come to similar conclusions, and Gabbard's reply.

Ershkovich's letter on Sagdeev reinforces my view that Alpert's attack on Sagdeev was irresponsible and that PT was irresponsible in publishing it.

ARTICLE- QUANTUM INFORMATION..: This is a fascinating topic and Bennett writes with great authority. However, I must confess that I found it too difficult to follow. Perhaps that is the nature of the beast. However, the graphics are attractive and that always makes one feel friendlier.

ARTICLE-HELIOSEISMOLOGY. Once again, the topic is fascinating. In this case I thought that I could understand it, but the text did not grip me. Too often it turned into a catalog of facts. ("Three ground-based networks of imaging helioseismological I edited it instruments are in various stages of development.")

ARTICLE-SCHWINGER. I saw this paper in the manuscript stage and thought that it was very disappointing. However, in PT it is absolutely first rate. The pictures, particularly Rabi, Schwinger and Weisskopf, add a great deal, the title was improved, and I suspect there was some editing. In any case, I enjoyed this immensely.

CAREER CHOICES. This is an excellent article, interesting in its own right and perfect for its goal of letting young physicists know the range or possibilities open to them.

BOOKS: The BEC volume is most timely, and makes a good headline for the section. The report of the Internet book points out that the book will be out of when the reader sees the review. Although the topic is pedestrian, the report provides a useful service. The new Feynman biography sounds pretty good but I question the need for yet another book. The review is relatively long. I would have opted for a briefer report. The book "Electric and Magnetic Interactions" is an undergraduate text. PT cannot hope to keep up with this category and should, in my opinion, leave it to AJP, which regularly reviews texts.

WE HEAR THAT: I am glad to hear of what is going on. I know that this column is not everyone's cup of tea, but it is mine.

OBITUARIES: The Ford obituary was extremely interesting to me. I knew Ford professionally but was never clear on what he had really done. He was somewhat of a joker which helped to obscure his accomplishments. The obituary is excellent. The other obituaries were also interesting to me as human documents. It is too bad that these stories must be told in a lugubrious context but I can't think of a suitable alternative.

I hope that these comments are useful. I will try to do the same for the November issue. However, if there are items for which you particularly want feedback, let me know and I will be sure to cover them.

Sincerely,

Dan

Physics Today

PHYSICS TODAY

Steven Jeff,

Paul & Beverly,

Albert Wheelon ask

that if we receive

letters to the editor about

lis article that we send

where you pleased with

the way his article

the way his article

the way his article

the way his article

From:

Stephen Benka - Editor of Physics Today (my supervisor)

To: Date: JSCHMIDT, bgl

Subject:

14 Feb 1997 (Fri) 17:24 Thought you'd like to know

Jeff, Barbara,

I just got a visit from my PhD advisor, who had a major complaint about about December issue. The Sikivie and Amato articles were "too damn good" and he spent far too much time with the magazine.

I thought you'd like to know. Kudos to you both.

-Steve

I edited this one

Recently won Nobel Prize in Physics

From:

"Martin L. Perl" <martin@SLAC.Stanford.EDU>

To:

Jeff Schmidt <jds@aip.org>
2 Sep 1997 (Tue) 17:13

Date: Subject:

Leptons After 100 Years Article

Dear Jeff

Thank you for changing my ugly duckling of a manuscript into a beautiful swan. You have done a wonderful job.

I have the following comments:

Page 35, column 2: the ***** in *See box 1 on page ****** 36 has not been inserted yet.

Page 39, column 2: the ***** in "See box 2 on page ***** 40 has not been inserted yet.

Page 36, bottom equation in column 2: space required between virtual and Z0.

Page 38, Figure 4: TAU DETECTION scheme might be changed to TAU DETECTION apparatus.

Page 40, Box 2, column i: yes, each h should be an h-bar.

Page 40, References: the names in Ref. 3 are spelled correctly; in Ref. 10 the page number is 2074; in Ref 16 the page number is indeed 79c, it is a conference proceedings and every page has a c added to the page number.

Thank you so much Jeff for all your helpa dn guidance. I am greatly looking forward to the issue.

Sincerely yours

Martin Perl

From Editor of Physics Today (my supervisor)

From:

Stephen Benka

To:

Date:

jeff 5 Feb 1998 (Thu) 20:15

Sullivan & Barth Subject:

Jeff,

I've gone through both articles, and left them on your chair with my notes.

I think they make a great package for our readers. Thanks for your help getting them done in time.

--Steve

From: To:

Kai-Henrik Barth <barth002@tc.umn.edu> Jeff Schmidt <jschmidt@aip.acp.org>
21 Apr 1998 (Tue) 11:05

Date:

Subject:

reprints received

Dear Jeff,

I just came back from Europe and found the reprints of my article waiting for me on my desk in my university office. Thanks again for all your effort and time. I am very happy with the final product.

All the best

Kai

Kai-Henrik Barth Program in History of Science and Technology 435 Walter Library University of Minnesota Minneapolis, MN 55455 612-626-8722 612-872-9323 (home) barth002@tc.umn.edu http://umn.edu/home/barth002/

We appreciate your outstanding performance.

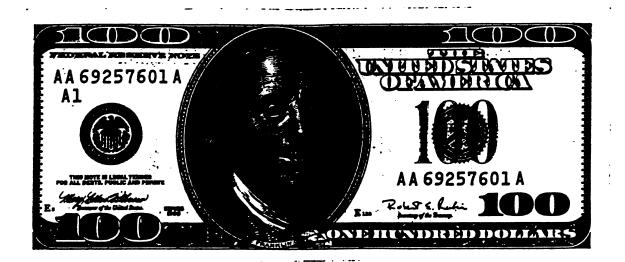


INTER - OFFICE MEMORANDUM

May 21, 1998

I, <u>Jeffrey Schmidt</u>, hereby acknowledge receipt of a cash "Pat on the Back" award in the amount of \$100. I understand that my year-end pay will reflect a "gross up" of this award.

Jeffrey Schmidt DATE



(my supervisor)

TRENDS IN ELECTROMECHANICA **TRANSDUCTION**

In today's world, it is nearly impossible to avoid contact with electromechanical sensors and actuators over the course of the day, although we rarely recognize them. They drive the keyless entry systems, the light switches that respond to sound or motion, the detectors in cars that determine whether seat belts are fastened and the sound-receiving and sound-

generating parts of the telephone, to name just a few

examples.

Electromechanical transducers are devices in which one connection to the environment conducts electrical energy and another conducts mechanical energy. Examples include microphones, loudspeakers, accelerometers, strain gauges, resistance thermometers, solenoid valves and electric motors.

There are many ways to categorize transducers. The largest breakdown divides them into sensors and actuators. Transducers used to monitor the state of a system, ideally without affecting that state, are sensors. Transducers that impose a state on a system, ideally without regard to the system load (the energy drained by the system), are actuators. However, this division, although useful, doesn't get to the heart of what makes transducers work.

It is useful to consider transducers from the perspective of energy conversion mechanisms, an approach that also yields two broad classes of devices: those based on geometry and those based on material properties. An example of a geometry-based transducer is a condenser microphone, which is a parallel-plate capacitor with a DC voltage bias between the plates. Sound causes one of the plates to move, thus changing the gap between the plates. This change dynamically alters the capacitance and produces an output voltage. An example of a material property-based transducer is a piezoelectric accelerometer. Piezoelectric materials are those in which there is coupling between the electric field and the mechanical field so that imposed electric fields cause dimensional changes and applied material strains produce voltages. In a piezoelectric accelerometer, acceleration strains the transduction material, giving rise to an electric field that is sensed as a voltage. Of course, these two broad classes may be

ILENE BUSCH-VISHNIAC is Temple Professor of Mechanical Engineering at the University of Texas at Austin and a visiting professor of aerospace and mechanical engineering at Boston University

The demand for more sophisticated sensors and actuators in industrial equipment and consumer products is behind today's push for new transducer materials and geometries.

By Ilene J. Busch-Vishniac

further refined either in terms of the function of the transducer (for example, sensing fluid flow) or in terms of narrower classes of energy conversion (for example, transduction based on piezoelectricity). The table on page shows the electromechanical main transduction mechanisms. Here the definition of "mechanical" is very liberal, in-

cluding thermal and optical phenomena.

The 1970s and 1980s brought dramatic changes in electronics and signal processing techniques, but only modest changes in electromechanical transducers. As a result, transducers are commonly the least reliable and most expensive elements in measurement and control systems. For this reason, there is a growing emphasis on the field of transduction, and significant changes are beginning to emerge.

Pervasiveness

In the last few decades, electronics have been incorporated into products of all sorts. Their growth in consumer products has been driven by two phenomena: the public's perception that low-technology (nonelectronic) devices are not as good as high-technology devices, and the push for products with "intelligence."

Low-technology devices whose market is being overtaken by high-technology counterparts range from office equipment such as staplers and pencil sharpeners to kitchen appliances such as juice squeezers. In many cases, we are replacing purely mechanical functions performed under human control by automated electromechanical operations, leading to the introduction of sensors

and actuators.

The growing market for intelligent products (those with a decision-making process) comes from the desires to automate some functions that people perform and to add functions that people cannot perform. For instance, although people can control room lights by hand, they often prefer to employ motion or sound detectors and control electronics instead. Examples of intelligent products that extend certain functions beyond standard human performance are smoke detectors, automobile airbags and clothes dryers with autodry cycles.

The growth in transducer markets has been rapid and is predicted to continue on its current pace through the turn of the century. The sensor market alone rose to become a \$5 billion a year industry by 1990, with projections for a \$13 billion worldwide market by the year 2000—an 8% annual growth rate over the decade.1

From:

To:

Stephen Benka jeff 15 Jul 1998 (Wed) 12:34 A call from Segev Date:

Subject:

Jeff,

I just spoke with Moti Segev, who is very appreciative of your efforts on his article. He's quite happy with the result.

Well done.

--Steve

From:
To:
Date:
Subject:

Toni Feder <tfeder@wam.umd.edu>
stephen benka <sbenka@aip.acp.org>

5 Oct 1998 (Mon) 19:00 Praise for Jeff & Gloria

Hi Jeff,

I saw Adrian Parsegian last week one evening when he was in Durham. He spoke extremely highly of you, saying how impressed he was with you, how articulate you are, and how much he enjoyed working with you on his article last year.

Just thought I'd pass this on....

Oh, and while I'm at it, as I already told Gloria, in a conversation with MIT's Hale Bradt last week, he said he was generally impressed by PT, and recalled that some years back, he gave Gloria feedback on a "messed up" draft of a story on pulsars she'd sent him. He continued that he didn't see the article again until it appeared in print, and he was really impressed. "She got all the nuances right. She must be really good. I admire her."

Toni



A I P INTER-OFFICE MEMORANDUM



To:

Jeffrey Schmidt

From:

T. C. Braun Js

Extension: 2293

Date:

February 8, 1999

Subject:

Perfect Attendance

CONGRATULATIONS!!!!! Our records indicate that you had perfect attendance for 1998. In accordance with our present policy, you have earned a cash incentive bonus of \$200 (subject to normal payroll taxes) and 2 bonus days. The bonus days must be taken within the year and may not be carried over into 2000. You will receive a separate check on payday, 25 February 1999. We thank you for your perfect attendance and wish you another healthy year in 1999.

17:01:0

From:

Stephen Benka

To:

Barbara Levi, Bert Schwarzchild, Charles Day, E...

Date:

Wed, Jul 14, 1999 1:38 PM

Subject:

ASA cites PT articles

I just learned that the Acoustical Society of America's "Science Writing Award to a Professional" went to llene Busch-Vishniac for her July 1998 article in PT, "Trends in Electromechanical Transduction." Jeff was the editor.

The previous such award from the ASA went to Mathias Fink for his March 1997 article in PT, "Time-Reversed Acoustics." Bert was the editor.

Well done, and well earned.

--Steve

CC:

Dr. James Stith, Gary Squires, Jeff Bebee, Marc...

GRAVITATIONAL RADIATION AND THE VALIDITY OF GENERAL RELATIVITY

Observing the speed, polarization, and back influence of gravitational waves would subject Einstein's theory to new tests.

Note from Editor of Physics Today

Clifford M. Will

(my supervisor)

While the detection of gravitational radiation may usher in a new era of "gravitational wave" astronomy (see the accompanying article by Barry Barish and Rainer Weiss, on page *****), it should also yield new and interesting tests of Einstein's general theory of relativity, especially in the radiative and strong-field regimes. Consequently, we are in an unusual situation. After all, we rarely think of electromagnetic astronomy as providing tests of Maxwell's theory. Neutrino astronomy may be a closer cousin: We can observe neutrinos to learn about the solar interior or about supernovae, while also checking such fundamental phenomena as neutrino oscillations. To some extent, the usefulness of astronomical observations in testing fundamental theory depends upon how well tested the theory is already. At the same time, since general relativity is the basis for virtually all discussion of gravitational-wave detectors and sources,1 the extent of its "upfront" validity is of some concern to us.

Although the empirical support for the theory of general relativity is very strong, it is still not as solid as the support for Maxwell's theory, and only in the last 35 years or so have precise tests been feasible. Furthermore, general relativity has not been tested deeply either in its radiative regime or in the regime of strong gravitational fields, such as those associated with black holes or neutron stars. (See figure 1.) Most tests, such as those carried out in the Solar System, check the theory only in its weakfield, slow-motion, nonradiative limit. One famous exception, the Hulse Taylor binary pulsar, does provide an important verification of the lowest-order radiative predictions of general relativity and is sensitive to some strong-field aspects. Still, important tests of gravitational radiation and its properties remain undone. Furthermore, interesting, well-motivated alternative theories to general relativity still exist that are in agreement with all observations to date. Gravitational-wave tests will remain of interest to us to the extent that they can further constrain the theoretical possibilities.

There are three aspects of gravitational radiation that

can be subjected to testing:

The polarization content of the waves (general relativity predicts only two polarization states, whereas other theories predict as many as six).

CLIFFORD WILL (cmw@wuphys.wustledu) is chair of the physics department, and a member of the McDonnell Center for the Space Sciences, at Washington University in St. Louis, Missouri.

> The speed of the waves (general relativity predicts a speed the same as that of light, whereas other theories predict different speeds).

> The back influence of the emitted radiation on the evolution of the source.

In this article, we discuss the three possibilities. First, though, we review the current status of tests of general relativity.2.3

The Einstein equivalence principle

At the heart of gravitational theory is a concept called the Einstein equivalence principle, which modernizes Newton's postulate of the equivalence of gravitational and inertial mass. It states first, that bodies fall with the same acceleration regardless of their internal structure or composition (this piece of the Einstein equivalence principle is called the weak equivalence principle), and second, that the outcome of any local nongravitational experiment is both independent of the velocity of the free-falling reference frame in which it is performed (local Lorentz invariance) and independent of where and when in the universe it is performed (local position invariance).

The Einstein principle implies that gravitation must be described by a theory in which matter responds only to the geometry of spacetime. Such theories are called metric theories. General relativity is a metric theory of gravity, but so are many others, including the "scalar-tensor" theory of Carl Brans and Robert Dicke, a theory based on earlier work by Paul Jordan. Strangely enough, string theory—a leading contender for a unified theory of particle interactions and for a quantum theory of gravity—does not strictly satisfy the metric theory definition. In string theory, matter can respond weakly to gravitation-like fields, in addition to responding to geometry. Consequently, testing the Einstein equivalence principle is a way to search for new physics beyond standard metric gravity.

To test the weak equivalence principle, we can compare the accelerations a_1 and a_2 of two bodies of different composition in an external gravitational field. The resulting measurements will yield the difference in acceleration divided by the average acceleration, $2|a_1 - a_2|/|a_1 + a_2|$, called the Eötvös ratio after Roland, Baron Eötvös of Vásárosnamény, whose pioneering tests of the weak equivalence principle at the turn of the century formed a foundation for general relativity.

The best test so far of the weak equivalence principle has been a series of experiments carried out at the



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r	·		

"Jeff Schmidt" <jschmidt@aip.acp.org>

To:

ACP.AIP(sbenka)

Date:

Mon, Sep 27, 1999 3:43 AM

Subject:

Compliment from Jerry Bernhold

Steve --

I got this nice note from Jerry Bernholc.

-- Jeff

>>> Jerry Bernholc <bernholc@ncsu.edu> 09/26/99 04:15pm >>>

Thank you very much for your help with the article and for your excellent editing job! I have already received quite a few nice comments. A number of people remarked that it was very well written.

CC:

ACP.AIP(JSCHMIDT)

Tris reads very well.

Note from Editor of Physics Today (my supervisor)

origin

First pages 21 334.00

MOSPHERIC INFRASOUND

Imagine a world in which you could hear not just nearby conversations and the noise of traffic a few blocks away, but also the sound of blasting in a quarry in the next state, the rumblings of an avalanche or volcano a thousand miles away, and the roar of a typhoon halfway around the world. Fortunately, nature has spared our senses from direct exposure to this inces-

sant din. But our relentless quest to extend our senses has yielded instruments that can do just that—and more. Waves of infrasound, sounds at frequencies too low for us to hear, permeate the atmosphere and offer us insights into natural and human-made events on a global scale.

The term infrasound was coined by following the convention adopted nearly two centuries ago for light waves. The invisible, longer waves below the red end of the visible spectrum were called infrared, and shorter waves beyond the violet end were called ultraviolet. ("Infra" and "ultra" are from the Latin, meaning "below" and "beyond," respectively.) The nominal range of human hearing extends from about 20 Hz to 20 000 Hz, so the inaudible sound waves with frequencies below 20 Hz were dubbed infrasound, while those above the upper limit of 20 000 Hz were named ultrasound. (Many animals can hear beyond the human limits, as described in the box on page *****.) Following the optical convention even further, frequencies just below 20 Hz are known as near-infrasound, and frequencies below about 1 Hz are often called farinfrasound. Near-infrasound, if sufficiently intense, is often felt rather than heard—as you might have experienced when you pass cars equipped with "mega-bass" audio systems.

Interest in atmospheric infrasound peaked during the Cold War as one of several ways to detect, locate, and classify nuclear explosions (from global distances.) Now, the Comprehensive Test Ban Treaty calls for a more sophisticated global sensor network to monitor compliance.1 There is a need to ensure that tests of clandestine, lowyield nuclear devices can be detected under conditions of noise, cloud cover, or other masking situations underground, underwater, or in the atmosphere. An integrated global sensor array now being deployed would address this problem by coordinating observations from multiple ground-based sensor types, including seismic, hydrdacoustic, and infrasonic arrays, working in concert. (See Jeremiah Sullivan's article on the Comprehensive Test Ban Treaty, PHYSICS TODAY, March 1998, page 24.)

In anticipation of a CTBT monitoring system, infra-

The search for ways to monitor compliance with the Comprehensive Test Ban Treaty has sparked renewed interest in sounds with frequencies too low for humans to hear.

> Alfred J. Bedard Jr and Thomas M. Georges

full circle to its origins. In this article, we review the science and technology of atmospheric infrasound, beginning with a brief history of its Cold War beginnings. Our focus, however, is on the richness of Earth's infrasonic environment, unheard and unknown until instruments were built to detect and record it. Practical applications of this new

science are just now being contemplated. (See figure 1, for example.) -३) [to stretch this last line]

A little history

Pressure waves from very powerful explosions may be detected after traveling several times around the Earth. Two famous pre-nuclear instances were the explosion of the Krakatoa volcano in 1883 and the Great Siberian Meteorite of 1909. Following each of these events, sensitive barometers around the world recorded impulsive pressure fluctuations as traces on paper charts. Later, meteorologists collected these charts from stations around the world and, by comparing arrival times, were able to reconstruct the progress of pressure waves radiating outward from the source at the speed of sound, sometimes passing an observing station two or three times.

But these disturbances pale when compared with the political shock waves from the explosion of the first Soviet atomic bomb in 1949. Cold War fears stimulated a flurry of "remote sensing" research much of it classified to detect and locate nuclear explosion at global distances. Among the technologies explored during those early years of the Cold War were seismic arrays, electromagnetic (radio to gamma-ray) sensors, and arrays of microphones to listen to very-low frequency sound waves in the atmos-

phere. Willow 1950s, a number of institutions contributed to the successful deployment of a global infrasonic monitoring network. Lewis Strauss, in his book, Men and Decisions, describes recording low-frequency air waves at the National Bureau of Standards in Washington, D.C., following a 1954 nuclear test in the Pacific. He took the recording to President Eisenhower and played a sped-up version that made the recording audible. Strauss emphasizes the strategic importance, during those early Cold War years, of nuclear intelligence provided by a worldwide monitoring system that included both remote sensing and a radionuclide sampling program.2

Early defense-driven infrasound research had multiple foci, including mathematical models for the intensity and spectrum of sound waves generated by various kinds of explosions how these waves propagate long distances through the atmosphere, what kinds of sensors would be best suited for detecting their signatures and how those signatures could be extracted from a bewildering variety of natural and human-made infrasonic noise. The Limited Test Ban Treaty of 1963, which prohibits testing of

please

DCA

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A I P INTER-OFFICE MEMORANDUM

To:

Jeffery Schmidt/Physics Today

From:

T. C. Braun CCB

Extension: 2293

Date:

11 February 2000

Subject:

Perfect Attendance

CONGRATULATIONS!!!!! Our records indicate that you had perfect attendance for the year 1999. In accordance with our present policy, you have earned a cash incentive bonus of \$200 (subject to normal payroll taxes) and two bonus days. The bonus days must be taken within the year 2000 and may not be carried over into 2001. You will receive a separate check on payday, 24 February 2000. We thank you for your perfect attendance and wish you another healthy year in 2000.

From:

"Johnson, Anthony" <johnsona@ADM.NJIT.EDU>

To:

"jschmidt@aip.org " <jschmidt@aip.org>

Date: Subject: Sat, Apr 8, 2000 5:23 PM Physics Today article

Dear Jeff:

I now have the galleys and I am quite impressed with how quickly you put together the two pieces. I am also quite happy with the editing of my submission. I only have one question and suggested minor change. The first paragraph of the article: The number of jobs posted that I received from Ed Goldin, shortly after the OFC conference was 2000. Is it safe to assume that the 3400 number that you are using is the updated number and not a typo? If all is well then this is an even more dramatic sign of opportunity in the field and warrants more accentuation. I suggest italics and an exclamation point for the following: "... 11 jobs per seeker!"

You've done a wonderful job and I have no further changes or comments. I will be visiting the School of Optics at the University of Central Florida on Monday and Tuesday and if you should need to get hold of me for some reason, my hosts are Professors Eric Van Stryland and George Stegeman. The Administrative Assistant at the School of Optics is Sarah Pimentel (Tel: 407-823-6916).

Best Regards,

Anthony

CC:

"sbenka@aip.org " <sbenka@aip.org>, "Crawley, Re...

2 w pages 16 Nov.91

Note from Editor of OF BACTERIA Physics Today (my supervisor)

Escherichia coli is a single-celled organism that lives in your gut. It is equipped with a set of rotary motors, each of which is only 45 nm in diameter and drives a long, thin, helical filament that extends several cell body lengths out into the external medium. assemblage of motor and fila-

E. coli, a self-replicating object only a thousandth of a millimeter in size, can swim 35 diameters a second, taste simple chemicals in its environment, and decide whether life is getting better or worse.

different kinds of proteins are required to produce the cell's chemotaxis, roughly half for the assembly of flagella and half for behavioral control.

of only about 60% of these

genes are known. About 50

When E. coli grows, it first gets longer and then divides in the middle. In a

Howard C. Berg

ment is called a flagellum. The concerted motion of several flagella enables a cell to swim. A cell can move toward regions that it deems more favorable by modulating the direction of rotation of its flagella. It does this modulation by measuring changes in the concentrations of certain chemicals in its environment (mostly nutrients) and deciding whether life is getting better or worse. Thus, in addition to rotary engines and propellers, E. coli's standard accessories include particle counters, rate meters, and gear boxes. This microorganism is a nanotechnologist's dream. Let us examine the features that make it so, from the perspectives of several scientific disciplines: anatomy, biology (genetics), chemistry, and physics.

What made the discovery of E. coli and its properties possible? The tale has two geneses. One involves light microscopy and begins in the 17th century, when Antoni van Leeuwenhoek first observed swimming bacteria.1 (See box 1.) The other involves molecular genetics and begins in the 20th century, when Joshua Lederberg demonstrated that bacteria have sex, as evidenced by their genetic recombination.2 (See box 2) Lederberg studied E. coli and Salmonella typhimurium, two closely related organisms. They are the principal subjects of work now being done on Abacterial chemotaxis (the motion of bacteria toward chemical attractants or away from chemical repellents). That work has yielded an important model for understanding organisms' behavior at the molecular level.

Anatomy of E. coli

E. coli (like S. typhimurium) is a cylindrical organism with hemispherical endcaps (as figure 1 shows). The cell, which weighs only 1 picogram, is about 70% water. Some strains are flagellated and motile; others are nonflagellated and nonmotile. When motile cells are grown in a rich medium (such as salts plus a mixture of amino acids), they swim in the direction of their long axis at a rate of about 35 diameters per second, often changing course but rarely stopping.

The chromosome of E. coli consists of a single doublestranded chain of DNA about 700 times longer than the body of the cell. There are 4 639 221 base pairs specifying 4288 genes, most of which encode proteins. The functions

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sense it is immortal, because the mother cell is replaced by two daughters, essentially identical to the daughters of the previous generation. The molecules of DNA in the members of a given set of descendants are identical except for mutations, which occur spontaneously for a given gene, at the rate of about 10⁻⁷ per generation.

If well fed and held at the temperature of the human gut (37 °C), E. coli can synthesize and replicate everything it needs to make a new copy of itself in about 20 minutes. Thus, if we start at noon today with one cell (and lots of food), by noon tomorrow there will be $2^{72} = 4.7 \times 10^{21}$ cells—enough to pack a cube 17 meters on a side! This replication rate explains why single cells dispersed on the surface of the hard form of nutrient agar soon become mounds of cells (colonies) a millimeter or so in diameter and why, in soft agar, the motile progeny of a single cell soon populate the entire plate.

Genetic analysis

A fully functional cell line, or strain, found in the wild is called a wild type. If a mutant cell is found that is missing a particular function, the gene carrying the mutation is named for that missing function. For example, a che gene is one encoding a protein (polypeptide) required for chemotaxis. A cell with such a defect develops flagella and swims, but it does not respond normally to chemical stimuli. The first gene of this type to be identified is called cheA (in italics), the second is called cheB, and so on through the alphabet. When the protein encoded by the gene is identified, it is called CheA (capitalized and in roman type).

In bacterial chemotaxis, besides the che genes, we encounter fla genes, so named for their defects in the synthesis of flagella (these genes are now called flg, flh, fli, or flj, because there turned out to be more than 26). There are also mot genes, named for defects in motility, or generation of torque. And there are a variety of genes that specify specific chemoreceptors; one, for example, tar, is a gene encoding the chemoreceptor Tar, which is so named because it mediates taxis toward the amino acid aspartate and away from certain repellents. The soft-agar plate shown in box 2 was inoculated with wild-type cells at the top, cells of a tsr (the s stands for serine) strain at the right, cells of a tar strain at the bottom, and cells of a smooth-swimming che strain at the left.

Another excellent article!

— Steve "/23/99 Note from Editor of Physics Today (my cupervisor

HYSICS AND TION REVOLUTION

In the fourth century BC, a young man named Pythias was condemned to death by Dionysius, the tyrant of Syracuse, for plotting against him, but Pythias was granted three days' leave to go home to settle his family's affairs after his friend Damon agreed to

Quantum physics holds the key to the further advance of computing in the postsilicon era.

Joel Birnbaum and R. Stanley Williams

Even in the early days of ENIAC, though, technologists dreamed of smaller, faster, and far-more-reliable computers. An article by a panel of experts in the March 1949 issue of Popular Mechanics confidently predicted that someday a computer as pow-

take his place and be executed should Pythias not return. Pythias encountered many problems but managed to return just in time to save Damon. Dionysius was so struck by this remarkable and honorable friendship that he released them both.

The decades-old friendship between computer technology and physics has also been a remarkable and honorable one, and it, too, has produced salutary results. Present-day experimental and theoretical physicists depend on computing, and have incurred a debt that they have repaid many times over by making fundamental contributions to advances in hardware, software, and systems technologies. (Figure 1 shows an experimental computer and one of its developers.)

In this article, we discuss the physical and economic limits to the geometrical scaling of semiconductor devices that has been the basis of much of the computer industry's progress over the last 50 years. We then look at some of the options that may be available when we come up against fundamental physics barriers sometime after 2010.

Disruptive technology

The first stored-program electronic computer, ENIAC (the Electronic Numerical Integrator and Computer), was built in 1946. A major triumph for vacuum-tube technology, ENIAC could add 5000 numbers in one second. At that rate, it could calculate the trajectory of an artillery shell in only 30 seconds, whereas an expert human with a mechanical calculator would have needed some 40 hours to complete the task. The machine was large (see figure 2)—and expensive. ENIAC . . .

- Contained 17 468 vacuum tubes
- Weighed 60 000 pounds
- Occupied 16 200 cubic feet
- ▷ Consumed 174 kilowatts (233 horsepower)

The amount of energy ENIAC expended to compute a single shell trajectory was comparable to that of the explosive discharge required to actually fire the shell. ENIAC was still the fastest computer on Earth nine years later, when it was turned off because the US Army could no longer justify the expense of operating and maintaining it.

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erful as ENIAC would contain only 1500 vacuum tubes, weigh only 3000 pounds, and require a mere 10 kilowatts of power to operate. Such a machine would be about the size and weight of an automobile, said the experts, with power consumption to match. What was intended to be a bold projection seems quaintly conservative to us now. These days, a palmtop computer is thousands of times more powerful than the ENIAC was.

The reason for the experts' now-laughable error is that their prediction was based on the wrong foundation—reasonable extrapolation of the in-place vacuumtube technology. The transistor, which had already been invented and represented a disruptive technology-that is, a technology that could totally displace vacuum tubes in computers, as electronic calculators later replaced slide rules—was completely ignored.

By 1949, after 40 years of development, vacuum-tube technology was mature, and the associated manufacturing infrastructure was enormous. In 1938 the vacuum tube had still been a decade away from its ultimate accomplishment. But already there was a significant search for something that would be better: a solid-state switch. The development of that switch required a great deal of basic research, both in materials purification and in device concepts.

Even though transistors as discrete devices had significant advantages over vacuum tubes and progress on transistors was steady during the 1950s, the directors of many large electronics companies believed that the vacuum tube held an unassailable competitive position.

Their companies were eventually eclipsed by the ones that invested heavily transistor technology R&D and that were poised to exploit new advances. As we shall see, there are eerie parallels with the situation today.

Moore's law

Gordon Moore of Intel Corp was the first to quantify the steady improvement in gate density when he noticed that the number of transistors that could be built on a chip increased exponentially with time. (See figure 3.) Over the past 24 years, that exponential growth rate has corresponded to a factor-of-four increase in the number of bits that can be stored on a memory chip in every device generation of about 3.4 years—an increase of 16 000 times!

This exponential growth in chip functionality is closely tied to the exponential growth of the chip market,